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PREVALENCE RISK OF INSULIN RESISTANCE IN PATIENTS WITH POLYCYSTIC OVARIAN SYNDROME

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ABSTRACT

Polycystic Ovary Syndrome recently has been identified as a risk factor associated with diabetes. The aim of the present observational study was that to estimate the prevalence of insulin resistance in Polycystic Ovary Syndrome and analyze its clinical parameters. This study was conducted at Ahalya Nursing Home A Infertility Center, Guntur, Andhra Pradesh, India. Out Patients of different age groups were selected for this study. Data were collected on the pre-designed questionnaire. During the 6 months study period, 300 females have participated and among them, 250 are suffering from PCOS. The study populations of 250 female 70% of them are suffering from Insulin Resistance. Demographic details involved in the study were categorized based on age, menstrual history, and GTT test. The results were analyzed and reported. According to the age distribution of patients, 110 (44%) were between 20-25 years, 80 (32 between 26-30 years of age and 60 (14) between 31-35 years of age. The prevalence of Insulin Resistance was 34.80% and it was concluded that a strong association of PCOS with insulin resistance.

KEYWORDS: Polycystic Ovary Syndrome; Insulin Resistance; Age; Menstrual history; GTT.

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is the most common form of chronic anovulation associated with androgen excess.[1] It occurs in 5-10 % of women of reproductive age

group.[2] Stein and Leventhal[3] described the association of bilateral polycystic ovaries with signs of amenorrhea, oligomenorrhea, hirsutism and obesity and it was referred to as a polycystic ovarian disease, later on, to be known as PCOS to reflect the heterogeneity of this disorder. It can be defined as an association of hyperandrogenism with chronic anovulation without specific underlying disease of the adrenal or the pituitary glands.[4] According to the European Society for Human Reproduction and Embryology (ESHRE) and American Society for Reproductive Medicine (ASRM)[5] presence of any two of the following three criteria can be used for diagnosis:

Polycystic ovaries on ultrasound scan;
Oligo and/or anovulation; and
Clinical or biochemical evidence of hyperandrogenism, provided other etiologies (congenital adrenal hyperplasia, androgen-secreting tumours, cushing syndrome) have been excluded. Also, the presence of 12 or more follicles in each ovary, measuring 2-9 mm in diameter, and or increased ovarian volume (>10ml) is considered as morphological diagnostic criteria based on ultrasonography.[1,6]

One of the most significant disorder was the demonstration of a unique form of insulin resistance (IR) and associated hyperinsulinemia.[2,7] Insulin Resistance is characterized by impaired glucose response to the specific amount of insulin.[1] It can be clinically defined as the inability of known quality of exogenous or endogenous insulin to increase glucose uptake and use in an affected individual as much as it does in normal person. It is a major factor in the pathogenesis of non-insulin dependent diabetes mellitus. IR is frequently observed in lean and obese women with PCOS. This association of IR and anovulatory hyperandrogenism is commonly found throughout the world and among different ethnic groups.[8] Long-term health implications of PCOS include metabolic disorders (hyperinsulinemia and IR, impaired pancreatic beta cell function and increased risk of type 2 diabetes, obesity, hyperlipidemia) and increased risk of cardiovascular disease.[5,9-14]

Pathophysiology[15]

- Chronically elevated luteinizing hormone (LH) and insulin resistance are 2 of the most common endocrine disorders seen in PCOS

- The genetic cause of high LH is not known. It is interesting to note that neither an elevation in LH nor insulin resistance alone is enough to explain the pathogenesis of PCOS.
- *In vitro* and *In vivo* evidence offer support that high LH and hyperinsulinemia work synergistically, causing ovarian growth, androgen production, and ovarian cyst formation.
- Obesity, which is seen in 50% to 65% of PCOS patients, may increase insulin resistance and hyperinsulinemia.
- One important caveat is that the correlation between hyperandrogenism and insulin resistance has been recognized in both obese and non-obese anovulatory women.
- Thus, it is important to realize that a non-obese patient may also have insulin resistance. However, the insulin levels in obese women are higher than their nonobese women. Clinically, though, both groups will have evidence of hyperandrogenism and oligo-ovulation or anovulation.

Diagnosis

The doctor takes a medical history (menstrual periods, weight changes, etc.) and physical exam (blood pressure, body mass index [BMI], and waist size).[16-19] He will also check areas of increased hair growth. He might check ovaries if they are enlarged or swollen by the increased number of small cysts. A blood test is done to check cortisol, insulin, thyroid hormone, androgen, dehydroepiandrosterone sulfate, glucose levels, LH and follicle stimulating hormone, examination of the endometrium (lining of the womb). This lining becomes thick, which is known as endometrial hyperplasia if periods are not regular. This condition increases the risk of endometrial cancer. Serious health problems associated with PCOS are the risk of heart attacks, high blood pressure (4-7 times more than normal female), metabolic syndrome, diabetes or pre-diabetes in 50% of women before 40 years of age. High level of low-density lipids cholesterol and low level of high-density lipids.[20-25]

METHODOLOGY

This was an observational study, conducted in the outpatient department of Ahalya Nursing Home a Infertility Center. Diagnosed cases of PCOS were scrutinized for inclusion criteria of women between 20-35 years of age, non-pregnant and non- lactating, married or single, last abortion or delivery more than three months back, and with no history of diabetes and any other endocrine disorder. Those who were on insulin-sensitizing agent[26] within three months were excluded. Informed consent was taken from each selected patient after explaining the

study purpose. After taking a thorough history, anthropometric measurement and general physical examination were performed.

Operational modality

To asses that how many are suffering from PCOS and PCOS with IR in a group of the population.

Step 1: Group of the population of females are taken.

Step 2: The female patients who are willing to participate in this study are taken and then we asked them for the presence of signs and symptoms of PCOS.

Step 3: If the signs and symptoms are present the patient is considered as she is suffering from PCOS and the scan is performed to confirm the PCOS.

Step 4: In the scan, if the patient is diagnosed with PCOS then a GTT test is done.

RESULTS AND DISCUSSION

During the 6 months study period, 300 females have participated and among them 250 are suffering from PCOS. The study population of 250 female 70% of them are suffering from Insulin Resistance. Demographic details involved in the study were categorized based on age, menstrual history, and GTT (Figure1, 2, and3). The results were analyzed and reported in the tables (Table 1, 2 and 3). According to the age distribution of patients, 110 (44%) were between 20-25 years, 80 (32 between 26-30 years of age and 60 (14) between 31-35 years of age. The prevalence of IR was 34.80%. The frequency of other variables was found to be in table no.1 and figure no.1.

The Figure1 reveals that the patients had been suffering majorly from PCOS and they were suffering from Insulin Resistance and irregular menstrual cycles, in order of mobility 175 are suffering from Insulin Resistance in PCOS patients so they are showing highest range are suffering from Insulin resistance in PCOS. The results revealed that the Insulin Resistance was most common in the females having PCOS, this study employed in-depth interviews with appropriate probing to gain a full understanding of PCOS its characteristics and effect of IR. The findings of the study indicated that PCOS has effects of IR in the participants. This study highlights the risk of IR in PCOS patients.

Participants with Insulin Resistance was divided into less, mild, moderate, severe and very severe. It was done based on the GTT range. PCOS has many risk factors such as insulin resistance, hypertension, cardiovascular diseases due to changes in the hormonal imbalance.

The present study reveals that the prevalence of Insulin Resistance is one of the risk factors in PCOS patients. This study was done to know to pursue knowledge regarding their disease and its management to improve their QOL. The overall results of the risk factor of Insulin Resistance in PCOS patients are more.

In our study, the focus is on the risk factor of IR in PCOS patients. The participants having PCOS are prone to IR. We have also observed that the participants suffering from PCOS are in stress conditions. These conditions may lead to hormonal imbalance and may cause the Insulin Resistance. In view of this, it is necessary for clinicians to apply the concept of individuality when handling cases of PCOS. Health educators and clinicians should consider the effects of PCOS, especially the psychosocial and psychosomatic effects so that those affected can receive favourable support. The increased knowledge could lead to effective support and management of the pain. This demands an appropriate and proper health care service that will be easily accessible to participants.

SUMMARY

Women with PCOS have several risk factors for developing diabetes. They also have increased levels of cardiovascular risk factors: insulin resistance, obesity, dyslipidemia and hypertension. Menstrual irregularity may be an additional risk factor.

Table 1: Glucose levels range in Human beings.

Sl.no	Glucouse levels	Reference range
1	<140%	NORMAL
2	140 – 199%	HIGH
3	>200%	SEVERE

Table2: Age distribution of the participants in PCOS Study.

Sl.no	Age	Frequency	Percentage
1	20 – 25	110	44%
2	26 – 30	80	32%
3	31 – 35	60	24%

Table 3: Menstrual History in PCOS Patients.

Sl.no	Menstural History	No.of.Participants
1.	Irregular	185
2.	Regular	65

Table 4: Glucose Tolerance Test of the Participants.

Sl.no	Dipsi range	Severity	No.of participants
1.	<140%	Normal	75
2.	140% - 199%	High	140
3.	>200%	Severe	35

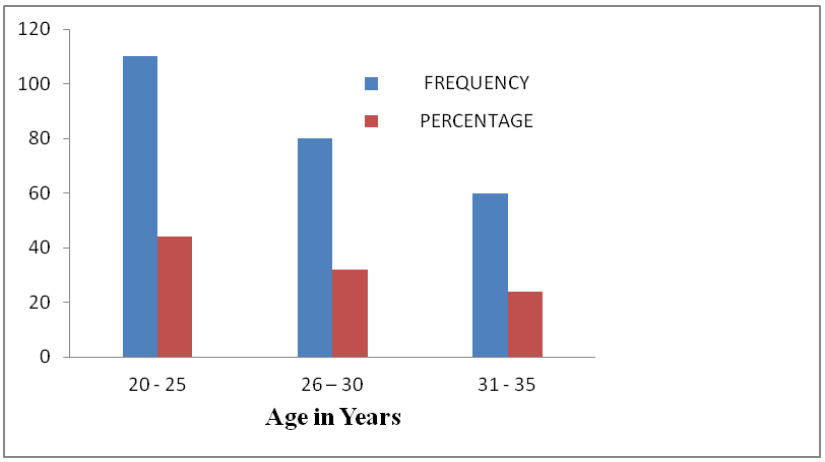

Fig. 1: Age Distribution of Patients in PCOS Study.

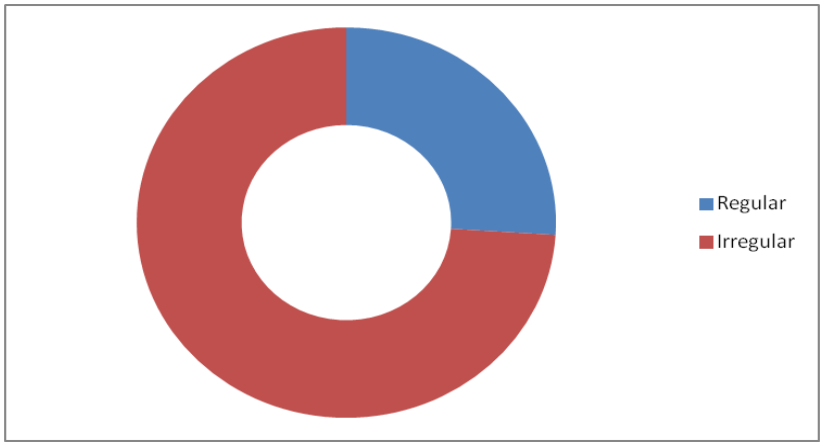

Fig. 2: Menstrual History in PCOS Patients.

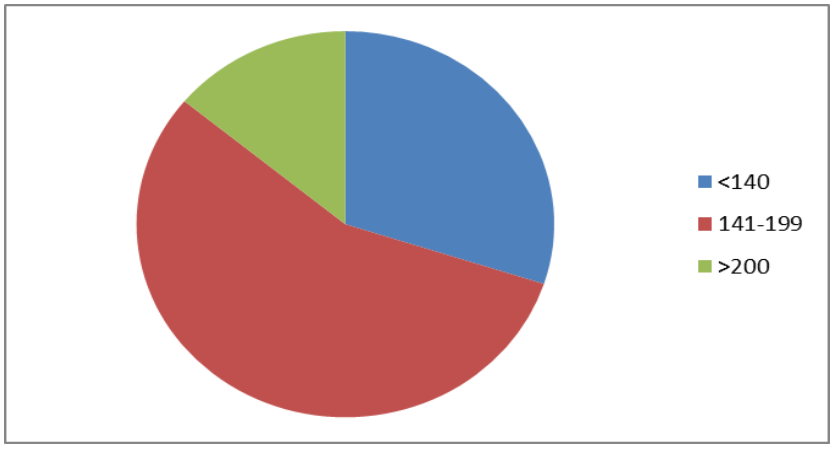

Fig. 3: Glucose Tolerance Test of the Participants.

CONCLUSION

The present study was concluded that the incidence of PCOS is increasing in the adolescent age group. The mental stress level in adolescents also increasing. Early diagnosis and treatment of PCOS in adolescents are essential in ensuring adulthood health. As teenagers are the future of a nation they should be dealt at an early stage and corrected. In this PCOS condition, the IR is one of the major risk factors. From this data, the prevalence of PCOS in this population revealed that 70% of females are suffering from insulin resistance. If we are able to understand and reduce the PCOS and it's risk factors in adolescents by not giving them undue pressure, and teach them how to manage or cope up with PCOS by taking proper treatment and relaxation techniques like yoga, we can prevent not only PCOS but also many of the lifestyle disorders.

CONFLICT OF INTEREST

The Author declares no conflict of interest.

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ABBREVIATIONS

PCOS: Polycystic Ovarian Syndrome; **IR:** Insulin Resistance;

ESHRE: European Society for Human Reproduction and Embryology; **ASRM:** American Society for Reproductive Medicine; **GTT:** Glucose Tolerance Test; **LH:** Luteinizing Harmone; **QOL:** Quality of Life

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