



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1403817>Available online at: <http://www.iajps.com>

Research Article

**STUDY TO KNOW THE INCIDENCE OF INSULIN  
RESISTANCE IN POLYCYSTIC OVARIAN SYNDROME  
PATIENTS**<sup>1</sup>Dr.Risham Fatima Pirzada , <sup>2</sup>Dr.Nadeem Khan, <sup>3</sup>Dr.Ayisha Afzal<sup>1</sup>University College Of Medicine and Dentistry, Lahore<sup>2</sup>Multan Medical and Dental College<sup>3</sup>University College of Medicine and Dentistry, lahore**Abstract:**

**Objective:** To determine the incidence of insulin resistance (IR) in polycystic ovarian syndrome patients with simple insulin resistance indices and to know the relation of PCOS clinical manifestations with insulin resistance indices.

**Study Design:** A cross-sectional study.

**Place and Duration:** In the Endocrinology Department of Services hospital, From December 2016 to December 2017 for duration of one year.

**Methodology:** A hundred patients who met the Rotterdam 2003 diagnostic criteria for polycystic ovarian syndrome were selected for the study. Descriptive statistics was recorded with standard deviation and frequency. Using fasting insulin levels ( $> 10$  IU / ml) Insulin resistance (IR) was calculated, fasting glucose / insulin ratio ( $> 4.6$ ). The different indirect IR signals were calculated as McAuley ( $< 5.8$ ), QUICKI ( $< 0.357$ ) and HOMA-IR ( $> 2.7$ ).

**Findings:** HOMA-IR, QUICKI and McAuley values were 65%, 88% and 51.2% in patients with PCOS, respectively. Patients with Blood sugar fasting levels ( $> 10$  uu / ml) were 76.02%. With hirsutism, infertility and obesity the most common presentation was Menstrual irregularities. There was a strong relation between various irregularities, insulin resistance and hyperinsulinemia .

**Conclusion:** High-frequency insulin resistance and hyperinsulinemia were seen in patients with polycystic ovarian-syndrome. With insulin resistance indices great numbers of clinical manifestations are related.

**Keywords:** Polycystic ovarian syndrome, Insulin resistance, homeostatic, model evaluation.

**\* Corresponding author:****Dr.Risham Fatima Pirzada ,**University College of Medicine and Dentistry,  
Lahore

QR code



Please cite this article in press Risham Fatima Pirzada et al., **Study to Know the Incidence of Insulin Resistance in Polycystic Ovarian Syndrome Patients.**, Indo Am. J. P. Sci, 2018; 05(08).

**INTRODUCTION:**

In the endocrine the most common problem is Polycystic ovarian syndrome (PCOS) which affects women in reproductive age with frequency of 6-11%. It is diagnosed a clinically characterized by the the following features and at least two features are necessary for confirmation; anovulation or Chronic Oligo-ovulation, polycystic ovaries and androgens on ultrasonography. Common clinical manifestations include a number of menstrual irregularities, infertility, obesity and hirsutism, and hyperandrogenism such as acne and alopecia. Despite the PCOS studies, the risk of developing hypertension, dyslipidemia in patients and associated with various metabolic abnormalities is increased, and the pathophysiology of glucose tolerance or PCOS and type 2 diabetes is not fully understood. The complex interactions between ovaries, insulin and gonadotropins action are responsible for PCOS and its various manifestations. The increase in affirmation supports the insulin resistance central role or the increase in insulin action in the pathogenesis of the syndrome. To evaluate insulin resistance and insulin sensitivity Various methods are used. This hyperinsulinemic clamp technique euglycemic glucose is the least modal analysis assay tested for glucose tolerance IV (TIVGTT) 11 and is frequently obtained from glucose values derived from various indices or an oral glucose tolerance and fasting insulin. The glucose clamp method is considered to be the most appropriate test to measure the effect of insulin presently available, but at the same time it is very complex technique and is not easy to administer. Proximal approach uses insulin in fasting stage and glucose calculations that give doctors less invasive and fastest method to obtain patient data. On PCOS ha Most of the studies have been done on people of European origin, so very little data on IR ratio in women in Southeast Asia is available. In PCOS patients to determine the frequency of insulin resistance this study was performed using insulin

resistance simple indices and to know the relation of PCO with insulin resistance and clinical manifestations.

**MATERIALS AND METHODS:**

This cross-sectional study was held in the Endocrinology Department of Services hospital, From December 2016 to December 2017 for duration of one year. All patients who were referred to the outpatient clinic were included in the detailed story in a pre configured form study. Included in the Rotterdam consensus workshop in 2003, Complete physical examinations, including weight, height, blood pressure and waist circumference measurements were performed on every patient. According to the Ferriman and Gallwey scores Hirsutism was evaluated. Biochemical hormone assessment was performed with lipid profile and insulin levels, TSH, OGTT, DHEA-S, progesterone, estradiol, prolactin 17 OH, fasting plasma glucose fasting serum testosterone, FSH, LH, (total). Ultrasound of the ovaries was performed on each patient. fasting insulin ratio, insulin resistance, sensitivity of qualitative control rate and homeostatic model evaluation (HOMA-IR), glucose fasting plasma insulin (QUICKI) and McAuley.  $HOMA-IR = \text{glucose (mmol / l) Insulin (IU / ml) / 23.05}$  Cut > 2611  $QUICKI = 1 \log (\text{fasting glucose}) + [\log (\text{fasting insulin}) \text{ cutoff value } < 0.35712]$  Index  $McAuley = \text{Exp} [2,63-028 \ln (\text{insulin mU / L}) - 0.31 \ln (\text{fasting plasma glucose (mg / dl) / triglyceride mmol / insulin (IU / ml) cut - off value } < 04.51 \text{ fasting.}]$

**RESULTS:**

In this study reproductive age women were selected.  $27.01 \pm 8.04$  was the mean age. Table I describes the distribution percentage of abnormal and normal clinical, ultrasonographic and biochemical characteristics of patients.

Table-I: Percentage distribution of different characteristics.

Age (yrs)	26.58 ± 7.84
15-20	25 (25%)
21-25	23 (23%)
26-30	27 (27%)
>30	25 (25%)
BMI (kg/m <sup>2</sup> )	31.92 ± 7.39
Underweight <18	2 (2.0%)
Normal 18 - 22	12 (12.0%)
Overweight 23 - 25	6 (6.0%)
Obese > 25	80(80.0%)
Age at menarche (yrs)	12.57 ± 1.01
<i>Marital status</i>	
Married	57 (57.0%)
Un-married	43 (43.0%)
<i>Menstrual problems</i>	
Irregular cycles	83 (97.64%)
Oligomenorrhea	38 (43.68%)
Amenorrhea (secondary)	21 (25.88%)
Hirsutism	48 (51.61%)
Infertility	26 (46.42%)
Serum Testosterone (ng/dl)	31.5 ± 50.12
FSH level (mIU/ml)	9.11 ± 12.28
Normal	(93.30%)
Abnormal	(6.70%)
LH level (mIU/ml)	13.20 ± 12.83
Normal	(59.2%)
Abnormal	(40.80%)
Insulin level	19.59 ± 14.62
Normal	19 (24.68%)
Abnormal	58 (75.32%)
<i>Ultrasound of ovaries</i>	
Normal	(23.3%)
Abnormal	(76.67%)

100 patients had 51.61% hirsutism varying degrees, menstrual irregularity was observed in 86% of patients, obesity was observed in 80.6% (BMI > 25 kg / m<sup>2</sup>), 43.68% and 26.08% of patients were referred with secondary amenorrhea and oligomenorrhea respectively. In 47.2% of married women Infertility was observed. FSH and LH hormonal tests were 93.3% and 59.2%, respectively. Deteriorated GTT was found in 32% of cases, while type 2 diabetes was diagnosed in 12.9% of patients.

Table-II: Insulin Resistance in patients with PCOS.

Insulin Resistance	N	%
Fasting Insulin level (> 10)	61	75.3
HOMA-IR (> 2.6)	46	67.6
QUICKI (< 0.357)	60	88.2
McAuley (< 5.8)	21	48.8
Fasting G : I ratio (< 4.5)	21	31 %

Using different indices of insulin resistance measurement frequency of PCO measured given in Table II. McAuley and HOMA - IR, QUICKI values were 68.02%, 89.012% and 49.02% respectively. Fasting insulin levels were > 10 IU / ml in approximately 75.3% of the patients. The echographic appearance of the polycystic ovaries identified in the Rotterdam 2003 consensus study (76.7%) was seen in the patient. There was a strong association between PCO and various abnormalities, insulin resistance and hyperinsulinemia.

Table-III: Association of clinical features of PCO patients with insulin resistance indices.

	HOMA IR	QUICKI	Fasting insulin	McAuley	Glucose to insulin ratio
Menstrual irregularities	1.65(0.33-8.15)	1.28(0.13-12.3)	1.02(0.12-3.2)	1.3(0.26-6.82)	1.13(0.20-6.36)
Hirsutism	0.69(0.24-2.05)	0.86(0.17-4.22)	0.59(0.2-1.75)	0.80(0.22-2.9)	0.72(0.25-2.09)
Infertility	0.8(0.18-3.42)	1.32(0.194-9.02)	1.18(0.23-6.11)	3.0(0.35-25.86)	2.07(0.53-7.99)
Diabetes	0.66(0.55-0.79)	0.87(0.79-0.96)	0.72(0.62-0.83)	0.46(0.33-0.64)	1.5(0.23- 9.77)
Cystic Ovaries	2.93(0.71-12.1)	12.08(1.88-77.66)	9.6(2.22-41.52)	2.5(0.48-12.88)	1.68(0.37-7.63)
Obesity	3.5(0.91-13.44)	4.4(0.82-23.5)	3.57(1.01-12.58)	5.06(0.511-50.2)	2.45(0.47-12.6)

Similarly, most clinical findings are associated with insulin resistance indices (Table III).

#### DISCUSSION:

In this study, simple IR indices, clinical presentation, biochemical and ultrasonic characteristics and the frequency of insulin resistance were documented in patients with PCOS. The wide variation in the presentation characteristics of PCOS leads to difficulties in the analysis of PCOS patients and compares the data with other studies performed in the regional and international arena. The results of our study revealed the incidence of hyperinsulinemia (fasting insulin level > 10) and insulin resistance when compared to studies in white Caucasian PCOS patients. Studies have shown that fasting insulin levels are higher in 40% of women with PCOS, but we found that 60-80% of hyperinsulinemia and insulin resistance in our study were comparable to other studies. The results of our Locally Hyperinsulinemia can also be compared with the results of another study with a 55-60% incidence in immigrants from South Asia (Indians and Sri Lankans) residing in the UK. For this reason, ethnic and genetic effects on the insulin resistance frequency in PCOS patients can not be ruled out. In anovulatory women Insulin resistance with PCOS is much obvious than in equally hyperandrogenic women with regular menstruation. With our study these results correlates well, as with insulin resistance patients have a number of menstrual disorders, such as oligomenorrhea or secondary amenorrhea, such as obesity. A variable degree of hirsutism was observed in 47.36% of the patients, but this is not always associated with serum testosterone levels, indicating hirsutism in the nonpathologic population. Studies have shown that ethnic variations in hair growth rate must be taken into account in all patients with hirsutism. 80.0% of our study was obese with 25 or more BMI. In different studies, obesity was observed in 40-70% of patients with PCOS. WHO redefined cut-off values for obesity in women in South Asia; BMI > 25, Caucasian is considered to be BMI > 30 for women. Class I is considered to be obesity. Because it is an old condition, PCOS with PCOS is associated with insulin resistance in patients with a tolerance of wider glucosome, eg tolerance tolerance, type 2 cardiovascular complications of diabetes, dyslipidemia and metabolic complications. vascular risk factors.

#### CONCLUSION:

In this study it is concluded that Large-scale epidemiological studies of large-scale UR treatments will be effective, so patients affected by the insulin resistance level of patients in South Asia need to be assessed.

#### REFERENCES:

1. Rackow, B.W., Brink, H.V., Hammers, L., Flannery, C.A., Lujan, M.E. and Burgert, T.S., 2018. Ovarian Morphology by Transabdominal Ultrasound Correlates With Reproductive and Metabolic Disturbance in Adolescents With PCOS. *Journal of Adolescent Health*, 62(3), pp.288-293.
2. Giandalia, Annalisa, Maria Angela Pappalardo, Giuseppina T. Russo, Elisabetta L. Romeo, Angela Alibrandi, Flavia Di Bari, Roberto Vita, Domenico Cucinotta, and Salvatore Benvenga. "Influence of peroxisome proliferator-activated receptor- $\gamma$  exon 2 and exon 6 and insulin receptor substrate (IRS)-1 Gly972Arg polymorphisms on insulin resistance and beta-cell function in Southern Mediterranean women with polycystic ovary syndrome." *Journal of Clinical & Translational Endocrinology*(2018).
3. Hassani, Fatemeh, Shahrbanoo Oryan, Poopak Eftekhari-Yazdi, Masood Bazrgar, Ashraf Moini, Nahid Nasiri, and Ali Sharifi-Zarchi. "Down regulation of extracellular matrix and cell adhesion molecules in cumulus cells of infertile polycystic ovary syndrome women with and without insulin resistance." *Cell J (Yakhteh)* 21, no. 1 (2019).
4. Lin, H., Xing, W., Li, Y., Xie, Y., Tang, X. and Zhang, Q., 2018. Downregulation of serum long noncoding RNA GAS5 may contribute to insulin resistance in PCOS patients. *Gynecological Endocrinology*, pp.1-5.
5. Barber, T. M., Joharatnam, J., & Franks, S. (2018). Pathogenesis and Management of Adiposity and Insulin Resistance in Polycystic Ovary Syndrome (PCOS). In *Pediatric Obesity* (pp. 629-642). Humana Press, Cham.
6. Shorakae, Soulmaz, Sanjeeva Ranasinha, Sally Abell, Gavin Lambert, Elisabeth Lambert, Barbora de Courten, and Helena Teede. "Inter-related effects of insulin resistance, hyperandrogenism, sympathetic dysfunction and chronic inflammation in PCOS." *Clinical endocrinology* (2018).
7. Qi, J., Wang, W., Zhu, Q., He, Y., Lu, Y., Wang, Y., Li, X., Chen, Z.J. and Sun, Y., 2018. Local Cortisol Elevation Contributes to Endometrial Insulin Resistance in Polycystic Ovary Syndrome. *The Journal of Clinical Endocrinology & Metabolism*.
8. Gyftaki, Reveka, Sofia Gougoura, Nikolaos Kalogeris, Vasiliki Loi, George Koukoulis, and Andromachi Vryonidou. "Oxidative stress markers in women with polycystic ovary

- syndrome without insulin resistance." In *20th European Congress of Endocrinology*, vol. 56. BioScientifica, 2018.
9. Pascual-Corrales, Eider, Jose Luis Sanmillan, Maria Angeles Martinez, Manuel Luque-Ramirez, and Hector Escobar-Morreale. "Prevalence of mutations in the insulin receptor gene and lamin A/C gene in functional ovarian hyperandrogenism with insulin resistance." In *20th European Congress of Endocrinology*, vol. 56. BioScientifica, 2018.
  10. Naderpoor, Negar, Soulmaz Shorakae, Sally K. Abell, Aya Mousa, Anju E. Joham, Lisa J. Moran, Nigel K. Stepto, Poli Mara Spritzer, Helena J. Teede, and Barbora de Courten. "Bioavailable and free 25-hydroxyvitamin D and vitamin D binding protein in polycystic ovary syndrome: Relationships with obesity and insulin resistance." *The Journal of steroid biochemistry and molecular biology* 177 (2018): 209-215.
  11. Yilmaz, Bulent, Priyathama Vellanki, Baris Ata, and Bulent Okan Yildiz. "Diabetes mellitus and insulin resistance in mothers, fathers, sisters, and brothers of women with polycystic ovary syndrome: a systematic review and meta-analysis." *Fertility and sterility* (2018).
  12. Morishita, Miyuki, Toshiaki Endo, Tsuyoshi Baba, Yoshika Kuno, Keiko Ikeda, Tamotsu Kiya, Hiroyuki Honnma, and Tsuyoshi Saito. "Pioglitazone is effective for multiple phenotypes of the Zucker fa/fa rat with polycystic ovary morphology and insulin resistance." *Journal of ovarian research* 11, no. 1 (2018): 24.
  13. Markou, A., Alexandraki, K., Kafritsa, E., Androulakis, I., Syriou, V., Papanastasiou, L., Antipa, E., Tsikini, A., Samara, C., Piaditis, G. and Kaltsas, G., 2018, May. Non-alcoholic fatty liver disease and polycystic ovarian syndrome in lean and obese women of reproductive age. In *20th European Congress of Endocrinology* (Vol. 56). BioScientifica.
  14. Kadi, Hasan, Eyup Avci, Akin Usta, and Abdullah Orhan Demirtaş. "Morning blood pressure surge and its relation to insulin resistance in patients of reproductive age with polycystic ovary syndrome." *Reproductive Biology and Endocrinology* 16, no. 1 (2018): 75.
  15. Savic-Radojevic, Ana, Ilijana Mazibrada, Tatjana Djukic, Zoran B. Stankovic, Marija Pljesa-Ercegovac, Katarina Sedlecky, Jelica Bjekic-Macut, Tatjana Simic, George Mastorakos, and Djuro Macut. "Glutathione S-transferases (GSTs) polymorphism could be an early marker in the development of PCOS: an insight from non-obese and non-insulin resistant adolescents." *Endokrynologia Polska* (2018).