



## Analysis of effect of Metformin in polycystic ovarian syndrome in local female population of Pakistan

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### Abstract

**Introduction:** Polycystic ovarian syndrome or PCOS is recognized as one of the most prevalent endocrine conditions that affect a considerable proportion of women of reproductive age. It is primarily indicated as the morphological alteration of ovaries in the form of multiple cysts. **Objectives of the study:** The main objective of the study is to analyze the effect of Metformin in polycystic ovarian syndrome in local female population of Pakistan. **Materials and Methods:** This study was conducted at Service Institute of medical sciences, Lahore from Jan 2018 to March 2018. Women at or above 18 years of age, with an upper limit of those who have not undergone menopause, were included in the study. It was particularly ascertained from patient records that each participant has had a clinical diagnosis of PCOS from the hospital and has been using metformin as per a doctor's prescription. **Results:** The data consist of 50 patients. The mean age of the study participants was  $27.2 \pm 4.75$  years. All the participants were residents of Lahore. The ratio of married to unmarried patients was 1.7:1. **Conclusion:** It is concluded that Metformin has been realized to have a significant role in relieving the symptoms of polycystic ovarian syndrome.

**Keywords:** PCOS, Metformin, female population.

### Introduction

Polycystic ovarian syndrome or PCOS is recognized as one of the most prevalent endocrine conditions that affect a considerable proportion of women of reproductive age. It is primarily indicated as the morphological alteration of ovaries in the form of multiple cysts. The dysfunction further involves the biochemical and metabolic factors of hyperandrogenism and fertility issues. It is characterized as a heterogeneous abnormality due to the variation in its clinical presentation and underlying complications<sup>1</sup>.

Studies have determined that the prevalence of PCOS ranges between 2.2%-26.7%. According to studies conducted by Gul et al. and Nazir et al., the prevalence of polycystic ovarian syndrome is continually rising in Pakistan. One study has also estimated, in its findings, that the prevalence of PCOS tends to be higher by 40.9% among the Pakistani women with fertility issues<sup>2</sup>. Despite the increasing prevalence, the etiology of PCOS has not been documented in a clear manner. The indistinctness is more attributed to the variation in the clinical presentation of the condition, which may include weight gain and irregularities in the menstrual

cycle. Moreover, this syndrome has been identified as a preceding factor to chronic conditions like diabetes mellitus, which continues to rise in parallel with PCOS. It is observed that the disease commonly occurs among young females, affecting their reproductive abilities. Biochemical disturbances include elevated serum concentration of luteinizing hormones, testosterone, androstenedione and insulin<sup>3</sup>. Hyperinsulinemia appears to be the key to the pathogenesis of the syndrome. Polycystic ovary syndrome can manifest in number of ways<sup>4</sup>. At one end of the spectrum, the disease produces polycystic morphology and at the other end there are symptoms like obesity, hyperandrogenism, menstrual cycle disturbances and infertility<sup>5</sup>. These symptoms may occur either singly or in combination. It has been shown that insulin resistance is associated with PCOS. In addition, hyperandrogenism and insulin resistance may also be linked to each other<sup>6</sup>.

### Objectives of the study

The main objective of the study is to analyze the effect of Metformin in polycystic ovarian syndrome in local female population of Pakistan.

### Materials and Methods

This study was conducted at Service Institute of medical sciences, Lahore from Jan 2018 to March 2018. Women at or above 18 years of age, with an upper limit of those who have not undergone menopause, were included in the study. It was particularly ascertained from patient records that each participant has had a clinical diagnosis of PCOS from the hospital and has been using metformin as per a

doctor’s prescription. The duration of metformin use differed for each woman but was accounted for in the results. Women with any other co-morbidity such as diabetes, asthma, hypertension, history of stroke, or on any drug other than metformin were excluded from the study. The effects of metformin on symptoms before and after use were determined from the same participant. Recall bias is a possibility that is inherent in the design of cross-sectional studies. As our study population was regularly followed up by physicians for changes in symptoms, we were able to assist them to recall their initial symptoms and compare them to the results of metformin therapy.

### Main outcome measures

Clinical symptoms including hirsutism, menstrual cycle, BMI, fasting insulin levels and fasting blood glucose were assessed before and after treatment with metformin.

### Statistical analysis

The SPSS software was used for analysis. P value of the two groups with a significance set at  $p < 0.05$ . Results were considered to be of statistical significance if the two-tailed p-value was less than 0.05.

### Results

The data consist of 50 patients. The mean age of the study participants was  $27.2 \pm 4.75$  years. All the participants were residents of Lahore. The ratio of married to unmarried patients was 1.7:1. Table 01 presents the general attributes of the study group.

**Table 01:** Demographic characteristics of patients

Parameter	Variable	Frequency
Marital Status	Married	63
	Unmarried	37
Age of Menarche	< 12 years	18
	12 – 13 years	49
	14 – 15 years	22
	>15 years	11
Family History for PCOS	Positive	43
	Negative	57
Duration of Metformin Use	1 – 4 months	49
	5 – 12 months	18
	1 – 2 years	13
	More than 2 years	20

Table 02 shows the analysis of before and after treatment of metformin in all selected patients.

**Table 02:** analysis of comparison of metformin before and after treatment

Parameters	Variable	Before Metformin (%)	After Metformin (%)	Significance (p=0.05)
Ability to Conceive	Normal	22	32	0.096
	Problems	34	24	
	Not Recorded	44	44	
Changes in Weight	Gain	81	61	0.736
	Lost	19	39	
Mood Swings, Lethargy & Depression	Yes	92	64	<0.001
Daily Energy	High	46	63	<0.001
	Low	54	37	
Menstrual Irregularities	Yes	100	31	0.046
	No	0	69	
Acne & Hirsutism	Increase	83	58	<0.001
	Reduction	0	25	

## Discussion

Metformin is effective in achieving ovulation in women with polycystic ovary syndrome. Meta-analysis is valid only if the included participants of all the different studies represent the same overall population<sup>7</sup>. We included only studies of women who have clearly defined polycystic ovary syndrome. It has been determined in this study that the reproductive abilities of a woman with PCOS may not gain any benefits from metformin treatment. However, other studies have indicated that a combination therapy of metformin and gonadotropins may enhance ovulation induction among PCOS patients<sup>8</sup>. The mechanism of action of these two administrations is unknown and, thus, requires more research on the subject. Similarly, as seen in the results of this study, metformin does not appear to have a marked impact on the body weight of patients. Yet, it has been asserted in several studies that it may enhance weight loss and decrease weight gain in PCOS when given in combination with a supporting drug. Despite two insignificant findings, the study has presented a significant improvement in the problems and irregularities of the menstrual cycle among the patients suffering from the polycystic ovarian syndrome<sup>9</sup>. These results are supported by other findings, as metformin has been realized to have relieving effects on menstrual irregularities, which suggests its role in enhancing endocrine production and secretions<sup>10</sup>. It should be noted that as per the primary hypothesis, the study has recommended with

statistical significance that metformin has been effective in treating indications of menstrual irregularities<sup>11-12</sup>.

## Conclusion

It is concluded that Metformin has been realized to have a significant role in relieving the symptoms of polycystic ovarian syndrome. It also has significant effect on the BMI and fasting insulin levels resulting in decreased risk of cardio vascular disease and diabetes mellitus type 2.

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