

# Pregnant Females with Polycystic Ovary Syndrome (PCOS) and Effect of Metformin Against Gestational Diabetes Mellitus

Effect of  
Metformin  
Against Diabetes  
Mellitus In  
Pregnant

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## ABSTRACT

**Objective:** To study effect of metformin against diabetes mellitus in pregnant females with PCOS

**Study Design:** Descriptive cases series study.

**Place and Duration of Study:** This study was conducted at the Kishwar Fazal Teaching Hospital of Amna Inayat Medical College Lahore Period February 1, 2023 to July 31, 2023.

**Methods:** A follow up of two hundred pregnant women was done for absence or presence of Gestational Diabetes Mellitus until they got delivered. On pre-designed form, efficacy frequency in women having PCOS was recorded. The data analysis was done using Statistical Package of Social Services version 25.

**Results:** In one hundred sixty six women (83%) metformin efficacy got achieved. On the other thirty four (17%) women could not get efficacy. Seventy one (84.52%) was efficacy for age group between twenty to thirty years. Ninety eight (84.48%) was efficacy for age group between thirty one to forty years. Regarding patient's B.M.I (Body Mass Index) stratification of data was performed. Eighty four (100%) was efficacy for those having normal weight. Sixty five (93%) was efficacy for overweight patients. Thirty nine (59%) was efficacy for obese patients.

**Conclusion:** In 83% pregnant women metformin for control of plasma sugar had been proved to be effective. Moreover metformin recommendation suggested for PCOS resolution in pregnant women to stay away from GDM. Prevalence, Gestational Diabetes Mellitus, Pregnant Females, PCOS, Metformin, Efficacy

**Key Words:** Pregnant Females, Polycystic Ovary Syndrome (PCOS), Gestational Diabetes Mellitus

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## INTRODUCTION

Irregularities of menses, any ovarian cyst and increased levels of androgens constitute a syndrome called the Poly Cystic Ovary Syndrome (PSOS).<sup>1</sup> If polycystic disease of ovary, it would be a morphological form and if there is predominance of hyperandrogenemia it would be a biochemical variant of it. Follicular development was inhibited along with menstrual changes, ovarian microcysts and anovulation in case of hyperandrogenism.<sup>2</sup> About seven percent women were affected due to this. By 20.7% PCOS was prevalent in Pakistan.<sup>3</sup>

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Body mass index less than thirty of women having PCOS was usually associated with hyperinsulinaemia, altered tolerance of glucose and insulin resistance (although resistance to insulin may be there in lean females having PCOS).<sup>4</sup>

In a study on patients with PCOS ( who were not on metformin), Gestational Diabetes Mellitus (GDM) was concluded to be 44.4% and shown that GDM was more often a disease in pregnant females having history of PCOS and infertility.<sup>5</sup> Many metabolic versions of PCOS for example lipid profiles, sensitivity of insulin and glucose concentration in plasma got controlled by metformin. In comparison with normal women, females having PCOS had more propensities to encounter hypertensive conditions, loss of pregnancy at early stage and GDM against which benefits had been shown if such patients took metformin throughout pregnancy.<sup>6</sup> Studies had concluded that ninety percent patients on metformin did not get GDM while only ten percent got it despite getting metformin. While in some other similar study it was concluded that forty four percent patients on metformin got GDM while 96.65% did not.<sup>7</sup>

Because literature was limited in determining metformin efficacy frequency in women having PCOS

in relation to progression and prevention of GDM, we have opted to conduct this study.

**METHODS**

After obtaining ethical approval, a descriptive case series was carried out in Kishwar Fazal Teaching Hospital of Anna Inayat Medical College Lahore from February 1, 2023 to July 31, 2023. None-Probability Technique of Consecutive Sampling was used. On two hundred and twenty patients taking metformin and having PCOS (considering expected efficacy percentage to be ninety percent), the percentage of metformin efficacy was calculated with confidence level of ninety five percent (four percent error margin). Inclusion criteria: Pregnant women diagnosed PCOS, metformin prescribed and continuously taken throughout pregnancy; Twenty to forty years of age; Parity of any type; Patients after twenty eight to thirty week of pregnancy. Exclusion criteria: Previously diagnosed patients with Diabetes Mellitus (as per record or on history); Gestational Diabetes Mellitus patients (as per record or on history); Hypertension patients (as per record or on history); Hypothyroidism patients (because it is claimed to enhance chances to develop GDM; Patients with more than three miscarriages. Patients from Out Patient Department of Gynaecology and Obstetrics who fulfilled exclusion and inclusion criterions were two hundred and twenty. Consent (informed) was obtained from selected patients for their participation in this research study. Regarding PCOS physical examination after history was performed. All selected patients got followed to see absence or presence of GDM until delivery. Metformin efficacy frequency was obtained using pre-designed proforma while controlling biases via inclusion-exclusion criterions and stratification of data. Version 16 of Statistical Package of Social Sciences (SPSS) was used to enter and analyze data. For patient age (quantitative variable), Standard deviation and Mean were got calculated. BMI and age were stratified to deal with effect modifiers. Chi-square test (after stratification) got applied to calculate significance. A significant p-value stood to be equal or less than 0.05.

**RESULTS**

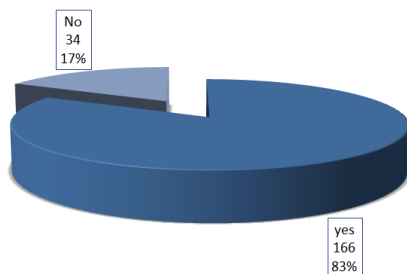


Figure No. 1: Metformin Efficacy Distribution

In one hundred sixty six women (83%) metformin efficacy got achieved. On the other thirty four (17%) women could not get efficacy (Figure 1).

Mean age ranged 33.22 plus/minus 5.33 years (Table 1).

Table No. 1: Descriptive Statistics of patient's age

Age (years)	N	200
	Mean	33.22
	Standard deviation	5.33
	Minimum	17
	Maximum	45

27.34 plus minus 5.83 Kilogram/meter<sup>2</sup> was mean Body Mass Index (BMI) (Table 2).

Table No. 2: Descriptive Statistics regarding Patient's BMI

BMI (kg/m <sup>2</sup> )	N	200
	Mean	27.34
	Standard deviation	5.83
	Minimum	17.57
	Maximum	35.15

Regarding patient's age data stratification performed. Seventy one (84.52%) was efficacy for age group between twenty to thirty years. Ninety eight (84.48%) was efficacy for age group between thirty one to forty years. Insignificant difference was noted as p was more than 0.05 (Table 3).

Table No.3: Efficacy Comparison Regarding Age

		Age (years)		Total
		20-30	31-40	
Efficacy	Yes	71 84.52%	98 84.48%	169 84.50%
	No	13 15.48%	18 15.52%	31 15.50%
Total		84 100.00%	116 100.00%	200 100.00%

Chi-Square Test = 0.711 p-Value = 0.69 (Insignificant) Regarding patient's B.M.I stratification of data was performed. Eighty four (100%) was efficacy for those having normal weight. Sixty five (93%) was efficacy for overweight patients. Thirty nine (59%) was efficacy for obese patients. Significant difference was noted as p was less than 0.05. (Table 4)

Table No. 4: Comparison of Efficacy as per B.M.I

		Body Mass Index			Sum
		Normal	Excess weight	Obesity	
Efficacy	Yes	84 100%	65 93%	39 59%	170 87%
	No	0 % 0%	3 4.9%	25 41%	30 12.9%
Sum		84 100%	69 100%	64 100%	200 100%

Chi-Square Test = 54.512 p-Value = 0.000 (Significant)

## DISCUSSION

Gestational diabetes mellitus affects 15-25% pregnancies the world over and hence the prevalent most in pregnant ladies. Hyperglycemia, type 2 diabetes, macrosomia and pre-eclampsia are complications of GDM. Women having GDM have propensity towards different reproductive problems and cancer of breast. Its reproductive and metabolic role had been explored through different life stages.<sup>8</sup> Pregnant women with diabetes having similar risk factors for unwanted outcomes of pregnancy if treated both by metformin and insulin were subjected to lesser weight gain and required lesser insulin for their blood glucose control. Moreover outcomes of neonates regarding macrosomia, hypoglycemia and distress of respiration were also improved as compared with treatment with insulin only.<sup>9</sup> For some meals metformin gives a postprandial glucose control better than that with insulin along with lesser increase in maternal weight but outcomes regarding mother and neonate remained same.<sup>10</sup> Insulin is preferred to treat GDM because metformin and glyburide both cross can cross placenta and hence are not considered to be first line agent. Despite sufficient data documented metformin efficacy and safety in GDM, there is insufficient data regarding far reaching effect of metformin on neonates.<sup>11</sup> If metformin exposure, disorder of fat metabolism and weight gain in later developmental stages can occur in neonates of pregnant ladies having GDM.<sup>12</sup> Women suffering from PCOS are likely to encounter GDM.<sup>13</sup> To reduce or prevent preeclampsia and GDM, incidence metformin has been proved to be highly effective.<sup>14</sup> Besides suppressing Gluconeogenesis in liver, sensitizing insulin, it has antitumor properties too and hence this drug has its wide anti-diabetes role<sup>15</sup> Not only it used in women with infertility and intolerance of glucose for treating PCOS but also in conjunction with other medicine to decrease chances to spontaneously abort fetus or loss of pregnancy in first trimester. Because of its useful role for fetus and mother, it was also recommended for other late stages in pregnancy<sup>16</sup>. As per our study in one hundred and sixty six (83%) women metformin efficacy got achieved. On the other hand thirty four (17%) women could not get efficacy because of GDM occurrence. For women having PCOS, after administering isoflavone for twelve weeks Jamilian discovered reasonable improvement in status of hormones, triglycerides, insulin resistance markers, oxidative stress biomarkers.<sup>17</sup> Clinical studies demonstrated that the metformin could efficiently increase sensitivity of insulin, help in losing weight and decrease levels of androgens in PCOS patients as readily as in adolescents.<sup>18</sup> In our study, 84.52% was metformin efficacy for age group between twenty to thirty years. Another research demonstrated the metformin use in

thorough pregnancy had an association to reduction in GDM patients having PCOS.<sup>19</sup> Moreover it could minimize preeclampsia risks in these patients as well; A long duration research suggested the metformin use for thirty six months in PCOS patients improved lipoproteins of high-density, BMI and diastolic control of blood pressure.<sup>20</sup> In our current study, 100% was efficacy for those having normal weight, 93% for overweight patients and 59% was metformin efficacy for obese patients.

## CONCLUSION

In 83% pregnant women metformin for control of plasma sugar had been proved to be effective. Moreover metformin recommendation suggested for PCOS resolution in pregnant women to stay away from GDM.

### Author's Contribution:

Concept & Design of Study: Sohail Bashir Sulehria  
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 Final Approval of version: By all above authors

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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