

## Adverse Pregnancy Outcomes in Women with Polycystic Ovary Syndrome

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### Abstract

*Objective:* The aim of this study was to know the adverse pregnancy outcomes and find out its association with polycystic ovary syndrome. *Material and Methods:* A case-control study was conducted at fertility center in Indore city from June 2014 to September 2015. The study population included seventy five women diagnosed with PCOS and 75 women without PCOS followed from early pregnancy. Incidence of gestational diabetes mellitus (GDM), pregnancy induced hypertension (PIH), preeclampsia, pre term delivery and caesarean section were determined. Statistics was done using statistical package for the social science (SPSS) 21.0. *Results:* The prevalence of miscarriage rate (all spontaneous losses <20 wks) was notable higher among PCOS group. The prevalence of GDM was significantly higher in women with PCOS as compared without PCOS group. The prevalence of PIH was two times higher in women with PCOS than that of women without PCOS (31.82% vs. 15.07%;  $p < 0.05$ ). The prevalence of preeclampsia was more among women with PCOS as compared to women without PCOS, but not significant (16.67% vs. 8.22%;  $p > 0.05$ ). The overall risk of pre term delivery was 27.27% in women with PCOS compared to 9.59% in women without PCOS,  $P < 0.01$ . *Conclusion:* The incidence of GDM, PIH and pre term delivery were significantly higher in women with PCOS as compared to women without PCOS.

**Keywords:** Adverse Pregnancy Outcomes; Gestational Diabetes Mellitus; Polycystic Ovary Syndrome; Pregnancy Induced Hypertension.

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### Introduction

Polycystic ovary syndrome (PCOS) is one of the most common endocrine disorder in reproductive age women and its prevalence varies broadly from 6% to 15% in general population depending on ethnicity studied and criteria utilized (Kumarapeli et al. 2008; Mehrabian et al. 2011). It is characterized by the presence of oligo or amenorrhea, polycystic ovary, hirsutism, raised LH: FSH ratio, insulin resistance (IR) and compensatory hyperinsulinemia (The Rotterdam ESHRE/ASRM - sponsored consensus

workshop group, 2004). IR has an important influence on the development of diabetes type 2 and hypertension (Perciaccante et al. 2006). Abdominal overweight and obesity also important components of PCOS that affect 30%-70% of the PCOS population (Pasquali et al. 2006; Vrbikova et al. 2009). In women with PCOS, pregnancy is often complicated by gestational diabetes mellitus (GDM), pregnancy induced hypertension (PIH), preeclampsia and also the risk for a preterm delivery or a delivery by cesarean section is raised (Boomsma et al. 2006; Altieri et al. 2010; Kjerulff et al. 2011; Qin et al. 2013). The new born babies stay more frequently in a neonatal intensive care unit and perinatal mortality also occurs more frequently (Wang et al. 2015).

However, not only PCOS, but also obesity, which is frequently accompanied by PCOS, is an independent risk factor of these obstetric complications (Frene et al. 2015). A few studies have reported an increased risk of adverse pregnancy and neonatal outcomes in women with PCOS. The purpose of the study was to determine the adverse pregnancy outcome in women with PCOS.

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## Methods

A case-control study was conducted at fertility center in Indore city from June 2014 to September 2015. The study population included seventy five women diagnosed with PCOS and 75 women without PCOS followed from early pregnancy. PCOS was diagnosed using the diagnostic criteria of the Rotterdam consensus 2003. All respondents were interviewed personally to obtain the relevant information. All parameters and pregnancy outcome were retrieved from medical records.

The diagnosis of gestational diabetes mellitus (GDM) was defined as fasting blood glucose level  $\geq 95$ mg/dl and oral glucose tolerance test (75 gm glucose orally administered and plasma glucose measured after 2 hours)  $\geq 155$  mg/dl. Pregnancy induced hypertension (PIH) was defined as blood pressure reading  $\geq 140/90$  mmHg. Preeclampsia is defined as blood pressure reading  $\geq 140/90$  mmHg in combination with proteinuria more than 300mg/24 hrs after 20weeks of gestation. Preterm birth defined as delivery at less than 37weeks of gestation.

Statistics was done using statistical package for the social science (SPSS) 21.0. All the values were expressed as percentage and mean  $\pm$  standard deviation (SD), continuous variables were compared using the Z - test and categorical data using the chi-square test. P values of  $<0.05$  were considered statistically significant.

## Results

The demographic characteristics of the women with PCOS and without PCOS are summarized in Table 1. Women with PCOS were slightly older than women without PCOS (mean age  $31.23 \pm 4.40$  yrs Vs  $29.63 \pm 4.09$  yrs,  $p < 0.01$ ). The age at menarche was found slightly more among women with PCOS as compare to without PCOS ( $13.93 \pm 1.65$  yrs Vs  $13.37 \pm 1.34$  yrs,  $p < 0.01$ ). BMI prior to pregnancy was statistically significant between women with and without PCOS ( $26.08 \pm 4.91$  kg/m<sup>2</sup> Vs  $23.36 \pm 3.26$  kg/m<sup>2</sup>,  $p < 0.01$ ). The length of gestation was statistically significant between both groups ( $34.17 \pm 5.59$  wks Vs  $36.40 \pm 3.36$  wks,  $p < 0.01$ ).

**Table 1:** Demographic characteristics of the study population

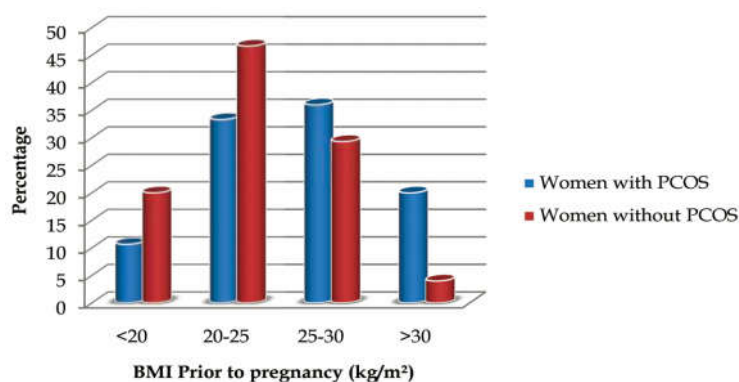
Characteristics	Women with PCOS (n=75) Mean $\pm$ SD	Women without PCOS (n=75) Mean $\pm$ SD	Z Value	P Value
Age (yrs)	31.23 $\pm$ 4.40	29.63 $\pm$ 4.09	2.305	<0.05*
Age at Menarche (yrs)	13.93 $\pm$ 1.65	13.37 $\pm$ 1.34	2.281	<0.05*
Pre pregnancy BMI (kg/m <sup>2</sup> )	26.08 $\pm$ 4.91	23.36 $\pm$ 3.26	3.997	<0.01**
Length of gestation (weeks)	34.17 $\pm$ 5.59	36.40 $\pm$ 3.36	2.971	<0.01**

\* Significant at 5% level; \*\* highly significant at 1% level; [BMI=Body mass index]

**Table 2:** Adverse pregnancy outcomes in women with and without PCOS

Adverse Pregnancy outcomes	Women with PCOS frequency (%)	Women without PCOS frequency (%)	Chi square value	P Value
Miscarriage (<20 wks)	9/75 (12.00%)	2/75 (2.67%)	-	-
GDM	23/66 (34.85%)	8/73 (10.95%)	11.414	<0.01**
PIH	21/66 (31.82%)	11/73 (15.07%)	5.478	<0.05*
Pre eclampsia	11/66 (16.67%)	6/73 (8.22%)	2.305	>0.05
Pre term Delivery	18/66 (27.27%)	7/73 (9.59%)	7.35	<0.01**
Cesarean Section	52/66 (78.79%)	48/73 (65.75%)	2.921	>0.05

\* Significant at 5% level; \*\* highly significant at 1% level



**Fig. 1:** Prevalence percentage of women with PCOS and without PCOS according to pre pregnancy BMI

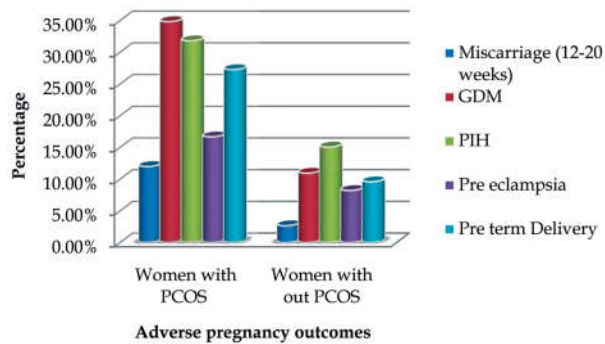


Fig. 2: Prevalence of adverse pregnancy outcomes in women with and without PCOS

Table 2 reveals the prevalence of adverse pregnancy outcomes and their association with PCOS in the study population. The miscarriage rate (all spontaneous losses <20 wks) in women with PCOS was 12.00% compared to 2.67% in women without PCOS. The percentage of women with ongoing pregnancy beyond 20 weeks who developed GDM was statistically significant in women with PCOS as compared to women without PCOS (34.85% vs. 10.95%,  $p < 0.01$ ). The prevalence of PIH was two times higher in women with PCOS than that of women without PCOS (31.82% vs. 15.07%;  $p < 0.05$ ). The prevalence of preeclampsia was more among women with PCOS as compared to women without PCOS (16.67% vs. 8.22%;  $p > 0.05$ ). The overall risk of pre term delivery was 27.27% in women with PCOS compared to 9.59% in women without PCOS,  $P < 0.01$ . The prevalence of cesarean section was higher in both groups.

## Discussion

The results of our study support the hypothesis that women with PCOS to have a higher risk of adverse pregnancy outcomes as compared to women without PCOS. We observed in our study that women with PCOS have an increased prevalence with increasing age of pregnancy. Similarly in previous study conducted by (Roos et al. 2011; Tehrani et al. 2011) also found that women with PCOS were slightly older than women without PCOS. Strong positive association was observed between pre pregnancy BMI and PCOS. PCOS was also associated with metabolic syndrome. This finding was consistent with study on pregnant women with PCOS (Baldani et al. 2012; Frene et al. 2014). The women with PCOS were observed to be at higher risk for developing GDM. These finding suggested that PCOS may be a predisposing factor of GDM (Paola et al. 2010; Roos

et al. 2011; Wang et al. 2013). It is important to note that, among the obese population, the effects of PCOS on the presence of GDM were mitigated, while the incidence of GDM among the women with PCOS did not differ significantly from the women with out PCOS. These results suggested that obesity may also play a role in the development of GDM (Turhan et al. 2003). Pregnant women with PCOS have a greater risk of PIH compared to women without PCOS in the present study, which is agreement with other studies (Altieri et al. 2010; Wang et al. 2013). We did not find any association between PCOS and preeclampsia. Similarly the prevalence of preeclampsia appears to be two-fold greater in women with PCOS, but was not statistically significant (Bagegni et al. 2010). We found that incidence of pre term was significantly high in women with PCOS. A similar but not statistically significant result was found by Altieri et al. 2010. Sterling et al. 2015 reported that women with PCOS often required assisted reproductive technology to become pregnant, increasing the risk of multiple births and hypertensive disease, which are associated with pre term delivery. There are certain limitations must be noted. The sample size was small and confounding variables (age and BMI) that were not controlled. Longitudinal studies are required in future to establish the facts in this direction.

## Conclusion

Our results suggest that women with PCOS were more likely to develop GDM, PIH and pre term delivery as compared to women without PCOS. We therefore suggest increased attention during antenatal care and delivery in women with PCOS.

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