



IMPACT OF POLYCYSTIC OVARY SYNDROME ON PREGNANCY OUTCOMES: AN OBSERVATIONAL STUDY ON MATERNAL AND NEONATAL COMPLICATIONS

Obstetrics & Gynaecology

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ABSTRACT

Background: With a prevalence of roughly 8–13% worldwide, polycystic ovarian syndrome is one of the most common endocrine disorders affecting women of reproductive age. The metabolic and hormonal changes that occur during pregnancy can be impacted by polycystic ovary syndrome (PCOS). PCOS-afflicted pregnant women are susceptible to a number of prenatal and postpartum complications that could have a negative impact on their pregnancy and the health of their unborn child. This study was conducted to evaluate the outcomes of pregnancy among PCOS women. **Methods:** An observational follow up study was conducted in OBG department of government tertiary care medical college and hospital in south India. The study period was between 2023 and 2024. Pregnant women diagnosed with PCOS were recruited through the outpatient clinic of OBG department. The antenatal details, metabolic parameters, maternal complications and neonatal outcomes were obtained. Data was entered in MS excel and analysis was done using SPSS version 24. **Results:** A total of 50 pregnant women with PCOS were included. The mean age of the participants was 28.3±3.5 years. Biochemical profile indicates that the patients generally had normal to elevated triglyceride levels, normal HDL levels, and a small percentage were diagnosed with mild hypothyroidism. The reported maternal complications was 54% whereas the postpartum complications was 19%. Out of 37 women who progressed to labour, there was a significant proportion of preterm delivery. **Conclusion:** Maternal, neonatal, and delivery complications are more likely to occur in women with PCOS

KEYWORDS

Polycystic Ovarian Syndrome, Neonatal Outcome, Maternal Complications, Metabolic Syndrome.

INTRODUCTION

Polycystic ovarian syndrome is one of the most prevalent endocrine disorders affecting women of reproductive age with prevalence of approximately 8 to 13% globally. The implications of PCOS extend beyond reproductive health, significantly influencing pregnancy outcomes and maternal health. PCOS is associated higher risk for pregnancy and birth complication.⁽¹⁾ The specific features associated with PCOS features include obesity before and during pregnancy, hyperandrogenism, insulin resistance, infertility, cardio-metabolic factors and poor mental health. PCOS is often not recognized as a risk factor for poor pregnancy and poor birth outcomes, while its associated features are.⁽²⁾ The pathogenesis of PCOS is predominantly in insulin resistance. Insulin is a regulator of glucose homeostasis by stimulating glucose uptake by insulin sensitive tissues and also suppressing hepatic glucose production and lipolysis. Insulin resistance is defined as decrease in the ability to perform these functions with normal pancreatic function.^(3,4)

The development of polycystic ovary syndrome (PCOS) can impact the metabolic and hormonal changes that occur during pregnancy.⁽⁵⁾ In addition to the majority of pregnancy pathologies, such as gestational diabetes mellitus, pregnancy-induced hypertension, preeclampsia, fetal growth restriction, preterm delivery, and small for gestational age, women with PCOS are at risk for antenatal complications during pregnancy, according to the World Health Organization.⁽⁶⁾ According to earlier research, babies born to pregnant women with PCOS are more likely to experience morbidity and need to be admitted to the neonatal intensive care unit.^(7,8) According to some reports, these women are more likely to experience spontaneous abortion and preterm delivery than healthy pregnant women.⁽⁹⁻¹²⁾ Due limited information available on pregnancy outcomes in PCOS, this study was designed to evaluate and compare the maternal and neonatal outcomes.

MATERIALS AND METHODS

An observational follow up study was conducted in OBG department of a Government medical college and hospital situated in Cuddalore district, South India. The study period was between September 2023 to October 2024. Pregnant women diagnosed with PCOS according to Rotterdam criteria prior to pregnancy, were recruited in the Outpatient clinic of Obstetrics and Gynecology department. The sample size was calculated using the open epi website. Using the previous study finding⁽¹³⁾, in which the prevalence of PCOS among pregnant women to

be 14%, with precision taken as 10% and 95% of confidence interval, the required sample size is 47 which is rounded off to 50. Convenient sampling method was employed.

A total of 50 PCOS pregnant women were included in our study. Those women with known cases of Cushing's syndrome, thyroid disorders, diabetes, 21-hydroxylase deficiency, hyperprolactinemia were excluded from the study. Pregnant women who were not willing to participate in the study were not included. The ante partum and postpartum obstetric complications were studied. The mode of delivery and neonatal outcomes and also comparing the implications of metabolic syndrome in such mothers. The collected information was entered in MS excel sheet and data analysis was done using SPSS software version 24.

RESULTS

A total of 50 study subjects diagnosed with PCOS were included in the study. The mean age of the study participants was 28.3±3.5 years. Majority were in the age group of 25-29 years (42%) followed by 20-24 years (32%) as shown in Fig-1.

More than half of the study subjects (54%) were with height of between 150-160 cm. With regards to waist circumference, 2/5 of the participants with PCOS were with below 80cm. Pre-pregnancy weight of more than half of PCOS mothers was 55-75 kg. Half of the study subjects were underweight as per BMI. More than 3/5th of the study subjects were with weight gain of less than 10 kg. (Table 1)

The biochemical profile indicates that the patients generally had normal to elevated triglyceride levels, normal HDL levels, and a small percentage were diagnosed with mild hypothyroidism (Table 2). Blood pressure distribution revealed that 40% of patients were hypertensive, with 13.3% classified as having severe hypertension, potentially indicating risks for preeclampsia.

More than half of the PCOS pregnant women didn't develop any maternal complications. 5 developed diabetes and 3 developed hypothyroidism. 13 pregnant women for whom abortion was done due to ectopic pregnancy, missed abortion and anembryonic abortion were not followed up. (Fig-3)

The majority of the deliveries were normal vaginal deliveries

accounted for 36%(18) (FTNVD), Cesarean sections accounted for 32%(12) of deliveries. One forceps-assisted delivery (2%) and one case of intrauterine death (2%) were recorded. (Fig 3) A total of 3 preterm deliveries (6%) were reported. Most pregnancies were singleton [32{64%}], with a small percentage being multiple pregnancies [5{10%}].

Postpartum complications were relatively minimal. A significant proportion of patients (60%) experienced no postpartum complications, while a small percentage (3.4%) experienced postpartum hemorrhage (PPH).(Fig-4) Prophylaxis for deep vein thrombosis (DVT) was administered in 13.3% of cases.

The majority of neonates had normal birth weights, with 40.5% falling in the normal range and 18.9% of low birth weight reported. APGAR scores were normal for most neonates (62%), reflecting healthy neonatal outcomes. However, there were instances of abnormal APGAR scores (38%) and neonatal mortality (5.4%), highlighting the risks associated with maternal complications. The survival rate was high, with 69% of neonates alive at birth. (Table 3)

DISCUSSION

Main findings identified in our study includes, ten first trimester pregnancy losses and one intrauterine death. The study found that 5.4% of cases had congenital abnormalities, such as kyphoscoliosis and ventriculomegaly. Preterm delivery happened in 6% of instances, and 10% of pregnant women with PCOS also had gestational hypertension (GHTN) and GDM, Maternal complications related to PCOS and metabolic syndrome significantly impacted the mode of delivery. The comparatively low rate of cesarean sections (32%) and high rate of vaginal deliveries incidence of postpartum hemorrhage (3%) and 16% of patients requiring DVT prevention because of the mothers' obesity.Fetal growth restrictions and macrosomia frequently coexisted due to placental insufficiency or poor glucose control—are reflected in the incidence of SGA babies (18.9%) and LGA babies (40.5%)

In the current study, ten first trimester pregnancy losses and one intrauterine death were reported ; these results are in line with Tabassum et al., who also found that women with PCOS had a high rate of early pregnancy loss, primarily because of insulin resistance and hyperandrogenism.⁽¹⁴⁾ They also support the findings of Wartena et al., who found that PCOS patients had a higher risk of spontaneous miscarriage, which is frequently independent of obesity but strongly connected to hyperandrogenism.⁽¹⁵⁾ According to our research, preterm delivery happened in 6% of instances, and 10% of pregnant women with PCOS also had gestational hypertension (GHTN) and GDM. These findings are consistent with those of Mirza et al., who emphasized that women with PCOS are more likely to develop GDM and hypertension as a result of the metabolic abnormalities that are a part of the syndrome.⁽¹⁶⁾

Although there were few postpartum problems reported in this study, there was one incidence of postpartum hemorrhage (3%) and 16% of patients requiring DVT prevention because of the mothers' obesity. These findings are consistent with those of Anuradha et al., who discovered that women with metabolic syndrome have higher rates of postpartum hemorrhage and venous thromboembolism, most likely as a result of underlying vascular abnormalities and increased coagulopathy.⁽¹⁷⁾ Maternal complications related to PCOS and metabolic syndrome significantly impacted the mode of delivery. The comparatively low rate of cesarean sections (32%) and high rate of vaginal deliveries (36 %) are in line with most research on PCOS pregnancies. The study found there was a significant proportion (6%) of preterm vaginal births and 30% of full-term normal vaginal births (FTNVD), which is comparable to Sawada et al.'s findings, where the vaginal delivery rate was higher.⁽¹⁸⁾

Only one case of intrauterine death (2%) and one forceps-assisted delivery (2%) were reported. The current study supports Roos et al.'s finding that women with PCOS had a lower rate of instrumental deliveries because of the high rate of planned cesarean sections. Since the current study included a population with a more advanced metabolic syndrome—a factor known to increase the need for cesarean delivery—this disparity might be the result of variations in clinical management.⁽¹⁹⁾

The dual risks associated with PCOS pregnancies—fetal growth restrictions and macrosomia frequently coexist due to placental insufficiency or poor glucose control—are reflected in the incidence of SGA babies (18.9%) and LGA babies (40.5%). These results are comparable to those of Anuradha et al., who found that pregnancies

with PCOS were more likely to experience both growth restriction and macrosomia.⁽¹⁷⁾ Our study's neonatal mortality rate (5.4%) is consistent with the findings of Mirza et al., who observed that preterm delivery and congenital abnormalities are the main causes of increased neonatal mortality in PCOS pregnancies, particularly those complicated by metabolic syndrome.⁽¹⁶⁾ The study found that 5.4% of cases had congenital abnormalities, such as kyphoscoliosis and ventriculomegaly. This is in line with Sawada et al.'s findings that mothers with PCOS are more likely to give birth to children who have congenital malformations.¹⁸ This is probably because PCOS pregnancies include metabolic and hormonal abnormalities that impact fetal development.⁽¹⁹⁾

CONCLUSION

Women with PCOS have a higher risk of maternal, neonatal, and delivery complications. However, with proper management and early intervention, these risks can be mitigated, leading to healthier outcomes for both mother and child. Further research is needed to improve treatment protocols for this high-risk population. And it is important to consider PCOS as an independent risk factor in high risk pregnancies.

Table 1- Anthropometric Measurements of the Study Subjects (N=50)

S.No	Variable	Frequency	Percent
1	Maternal Height(cm)		
	<150	8	16
	150-160	29	54
	>160	13	26
2.	Waist circumference		
	<80	20	40
	80-89	16	32
	>90	14	28
3.	Pre-pregnancy weight (kg)		
	<55	15	30
	55-75	28	56
	>75	7	14
4.	Pre-pregnancy BMI		
	<25	25	50
	25-30	16	32
	>30	9	18
5.	Weight gain		
	<5	10	20
	5-10	23	46
	>10	17	34

Table 2- Maternal Biochemical Parameters of PCOS Mothers (N=50)

S.No	Parameter	Mean±S.D
1	Fasting Blood Sugar (FBS) (mg/dL)	98.3 ± 12.7
2	Triglycerides (TGL) (mg/dL)	152 ± 28
3	High-Density Lipoprotein (HDL) (mg/dL)	44 ± 5.5
4	Thyroid Stimulating Hormone (TSH) (μIU/ mL)	2.12 ± 0.94

Table 3- Neonatal Outcomes of 37 Deliveries

S.No	Neonatal outcome	Frequency	Percent
1.	Birth weight		
	<2.5	7	18.9%
	2.5-3.5	15	40.5%
	>3.5	15	40.5%
2	APGAR score		
	Normal	23	62%
	Abnormal	14	38%
3.	Survival Outcome		
	Alive	35	94.6%
	Dead	2	5.4%
4	Congenital anomaly		
	Kyphoscoliosis	1	2.7%
	Ventriculomegaly	1	2.7%
	No Anomalies	35	94.6%

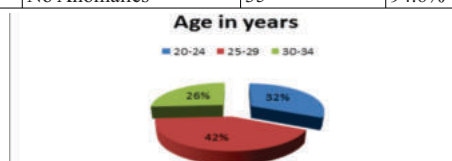


Fig 1- Age Distribution of Study Subjects (N=50)

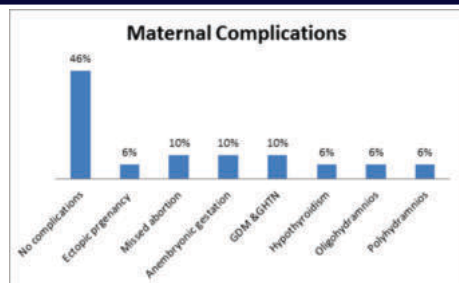


Fig- 2- Incidence of Maternal Complications Among the PCOS Mothers (N=50)

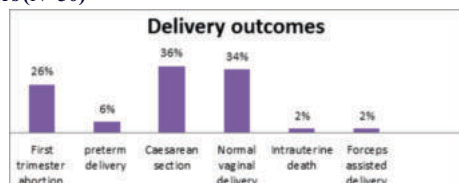


Fig3- Delivery Outcomes of Subjects with PCOS (N=50)

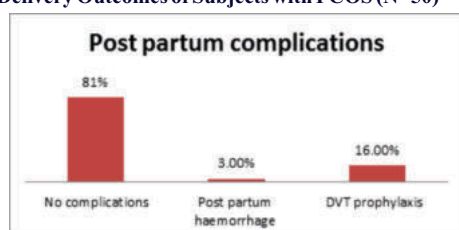


Fig 4- Incidence of Post-partum Complications Among the PCOS Mothers Who Gave Birth (N=37)

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