

Pregnant Women with A History of Polycystic Ovary Syndrome: A Risk Assessment for Gestational Diabetes Mellitus

Nutan Narayan¹, Sachin Sinha²

¹Assistant Professor, Department of Obstetrics and Gynecology, NMCH, Patna, Bihar, India

²DNB SS-Student, Department of Medicine, max Hospital Saket, New Delhi, India

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Corresponding Author: Dr. Nutan Narayan

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Abstract

Aim: The aim of the present study was to evaluate the risk of GDM in antenatal mothers with previous history of PCOS.

Methods: The present study was conducted in the Department of Obstetrics and Gynaecology, NMCH, Patna, Bihar, India from June 2023 to May 2024 and including 975 pregnant women, the medical records of 100 women diagnosed with PCOS were evaluated.

Results: 100 women reported PCOS. Older, higher BMI, and assisted reproductive technology usage were more common in women with PCOS before early pregnancy. The adjusted OR 1.55, 95% CI: 1.14–2.09, showed that women with PCOS had a greater risk for GDM than those without PCOS. PCOS was strongly linked to premature birth (adjusted OR 1.69, 95% CI: 1.08–2.67). The adjusted OR for GDM among women with PCOS adopting assisted reproductive technology was 1.44 (95% CI: 1.03–1.92) and among those who conceived spontaneously was 1.60 (1.18–2.15) in the stratified analysis using multivariable logistic regression (Figure 1). Preterm birth was also more likely in PCOS women independent of assisted reproductive technologies. Other bad birth outcomes were similar.

Conclusion: Our findings indicate that PCOS increases the risk of GDM and premature delivery. Further longitudinal research is required to understand PCOS during gestation and create effective preventative measures to protect mother and child.

Keywords: Gestational Diabetes Mellitus, Polycystic Ovary Syndrome, antenatal mothers

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Introduction

Gestational diabetes mellitus (GDM) is a disorder in which there is a reduced ability to tolerate glucose, occurs after 20 weeks Pregnancy, and is not associated with type 1 or type 2 diabetes mellitus.[1] Gestational diabetes mellitus (GDM) causes long-lasting adverse effects on both the mother and the infant.[2] Women with a history of gestational diabetes mellitus (GDM) have a much higher risk of acquiring type 2 diabetes mellitus compared to those without a history of GDM. In fact, their risk is around 10 times greater.[3] Maternal hyperglycemia may possibly elevate the risk of autism spectrum disorders, obesity, hypertension, type 2 diabetes, hyperlipidaemia, and cardiovascular disease in children.[4,5] The global occurrence of gestational diabetes mellitus (GDM) fluctuates between 9% and 25%, however in China it is within the range of 13.0% to 20.9%.[6] The increasing occurrence of GDM is believed to be associated with a higher incidence of maternal obesity and a trend to lower diagnostic standards.[7,8] Over the last ten years, the

prevalence at our institution has risen from 13.4% to 16.3%. Polycystic ovarian syndrome (PCOS) is a common illness that affects 8% of women throughout their reproductive years.[9,10] The syndrome is also associated with various comorbidities that lead to obesity and have long-lasting effects, including insulin resistance and metabolic syndrome.[11] Women diagnosed with Polycystic Ovary Syndrome (PCOS) have heightened levels of insulin resistance, which raises their vulnerability to developing Gestational Diabetes Mellitus (GDM). Twelve Thorough clinical research conducted by the National Institutes of Health has shown that PCOS is a clearly identifiable risk factor for GDM. Individuals with polycystic ovary syndrome (PCOS) have an increased likelihood of developing gestational diabetes mellitus (GDM) during pregnancy due to the possible occurrence of insulin resistance.[12-14] Nevertheless, a study[15] failed to establish any association between Gestational

Diabetes Mellitus (GDM) and Polycystic Ovary Syndrome (PCOS). Given the high occurrence of GDM and the benefits associated with early identification and appropriate care, it is essential to closely observe these patients throughout pregnancy and thereafter to identify the emergence of type 2 diabetes mellitus. Hence, it is vital to acquire understanding about the risk factors linked to this ailment to expedite early screening and detection of this condition. From an economic standpoint, it is more beneficial to do screening for gestational diabetes mellitus (GDM) in individuals who possess risk factors for GDM. The purpose of the current research was to investigate the risk of GDM in pregnant mothers with prior history of PCOS.

Materials and Methods

The present study was conducted in the Department of Obstetrics and Gynaecology, NMCH, Patna, Bihar, India from June 2023 to May 2024 and including 975 pregnant women, the medical records of 100 women diagnosed with PCOS were evaluated.

Inclusion Criteria

singleton pregnancies, <13 weeks of gestation at first prenatal visit, and history of GDM screening.

Exclusion Criteria

Multi-gestation pregnancies, diabetes, and missing delivery information were excluded. Electronic

medical records provided demographic, maternal medical, and labour and delivery data for 2389 deliveries.

We searched outpatient medical data for women diagnosed with PCOS before early pregnancy (<13 weeks).

PCOS was diagnosed using the Rotterdam 2003 criteria [11], which required polycystic ovaries, oligomenorrhea, and hyperandrogenism. Ultrasound detection of polycystic ovaries indicated 12+ follicles of 2-9 mm and ovarian volume ≥ 10 mL in at least one ovary. Oligomenorrhea is characterized as a menstrual cycle duration >35 days or <10 periods/year. Laboratory and/or clinical signs characterized hyperandrogenism.

Potential confounders included characteristics with a possible association with GDM, preterm birth, and fetal growth, including maternal age, maternal education, parity, pre-pregnancy body mass index (BMI), use of assisted reproductive technology, gestational age at delivery, and newborn sex. Data were obtained from hospital medical records.

Statistical Analysis

All *P* values <0.05 were considered statistically significant. Statistical analysis was performed using the statistical package SPSS, version 20 (SPSS Inc., Chicago, IL).

Results

Table 1: Maternal and newborn characteristics according to polycystic ovary syndrome (PCOS) status

Characteristics	Women with PCOS N=100	Women without PCOS N=975	P Value
Maternal characteristics			
Age at birth (years)	28.6 \pm 3.7	27.3 \pm 3.4	<0.001
<25	8	82	<0.001
25–29	45	575	
30–34	38	272	
≥ 35	9	46	
Education			
Junior high school or lower	11	90	0.634
High school	29	275	
College	48	490	
Undergraduate or higher	12	120	
Pre pregnancy BMI			
<18.4	10	110	<0.001
18.5–24.9	75	810	
25.0–29.9	12	44	
≥ 30.0	3	11	
Parity			
0	96	880	0.002
≥ 1	4	95	
Assisted reproductive technology			
Yes	15	30	<0.001
No	85	945	
Newborn characteristics			

Sex			
Male	55	525	0.743
Female	45	450	
Mean gestational age (weeks)	39.4 ± 1.5	39.6 ± 1.2	0.112
Mean birth weight (g)	3252 ± 428	3228 ± 408	0.190
Delivery mode			
Vaginal delivery	64	628	0.555
Cesarean delivery	36	347	

A total of 100 women reported a history of PCOS. Women with PCOS before early pregnancy were more likely to be older, had higher pre-pregnancy

BMI, and used assisted reproductive technology compared with women without PCOS.

Table 2: Risk of gestational diabetes mellitus (GDM) and adverse birth outcomes in women with polycystic ovary syndrome (PCOS) versus women without PCOS

Characteristics	Women with PCOS (n= 100)	Women without PCOS (n = 975)	Crude odds ratio (95% CI)	Adjusted odds ratio (95% CI)*
GDM				
Yes	18	112	1.52 (1.13, 2.03)	1.55 (1.14, 2.09)
No	82	863	Reference	Reference
Preterm birth				
Yes	9	42	1.93 (1.26, 2.95)	1.69 (1.08, 2.67)
No	91	933	Reference	Reference
Small for gestational age				
Yes	8	92	0.92 (0.62, 1.37)	0.79 (0.51, 1.23)
No	92	883	Reference	Reference
Large for gestational age				
Yes	12	176	1.43 (1.00, 2.03)	1.39 (0.98, 1.99)
No	88	887	Reference	Reference
Low birth weight				
Yes	6	44	1.13 (0.70, 1.84)	1.20 (0.74, 1.95)
No	94	931	Reference	Reference
Macrosomia				
Yes	7	40	1.56 (0.98, 2.52)	1.21 (0.94, 2.01)
No	93	935	Reference	Reference

In the adjusted analysis, women with a previous diagnosis of PCOS had a higher risk for GDM than women with no such diagnosis (adjusted OR 1.55, 95% CI: 1.14–2.09). There was also a strong association between PCOS and preterm birth (adjusted OR 1.69, 95% CI: 1.08–2.67). In the stratified analysis using multivariable logistic regression, the adjusted OR for GDM among women with PCOS undergoing assisted reproductive technology was 1.44 (95% CI: 1.03–1.92) and among women with PCOS who conceived spontaneously was 1.60 (1.18–2.15) (Figure 1). Also, the risk of preterm birth was increased in women with PCOS regardless of use of assisted reproductive technology. There was no difference in the incidence of other adverse birth outcomes.

Discussion

Polycystic ovarian syndrome (PCOS), one of the most prevalent endocrine illnesses occurring during

reproductive age, is characterized by ovulatory dysfunction, biochemical or clinical hyperandrogenism, and polycystic ovaries.[16] Its prevalence varies from 5% to 20% depending on the diagnostic criteria utilised.[17,18] PCOS is presently regarded a condition with metabolic repercussions that might impair women's health throughout various phases of reproductive age.[19] A total of 100 women reported a history of PCOS. those with PCOS before early pregnancy were more likely to be older, had higher pre pregnancy BMI, and utilized assisted reproductive technologies compared with those without PCOS. There are three possible explanations: (1) PCOS has different characteristics and clinical impact in different ethnic groups, (2) increased insulin resistance in PCOS has different clinical effects depending on the insulin metabolism characteristic of different ethnicities and environments, and (3) the prevalence of GDM in women with PCOS is affected by the different

diagnosis criteria (the WHO or the modified IADPSG criteria).[20] In addition, PCOS is a primary cause of infertility in women, and these women could need assisted reproductive technologies to get pregnant.[21] Some research have revealed that assisted reproductive technology is connected with an increased risk of GDM[22-24] research demonstrated that women with pregnancies who were conceived while undergoing assisted reproductive technology had lower glucose tolerance compared with those who conceived naturally.

In the adjusted analysis, women with a prior diagnosis of PCOS had a greater risk for GDM than women with no such diagnosis (adjusted OR 1.55, 95% CI: 1.14–2.09). There was also a robust link between PCOS and preterm delivery (adjusted OR 1.69, 95% CI: 1.08–2.67). In the stratified analysis using multivariable logistic regression, the adjusted OR for GDM among women with PCOS receiving assisted reproductive technology was 1.44 (95% CI: 1.03–1.92) and among women with PCOS who conceived spontaneously was 1.60 (1.18–2.15). Furthermore, women with PCOS had an elevated risk of preterm birth, regardless of whether they underwent assisted reproductive technology. There was no change in the incidence of any unfavourable birth outcomes. In earlier studies, women with PCOS generally used aided reproductive technology to get pregnant, increasing the risk of multiple births and hypertensive illness, which are related with premature delivery. [25-27] The relationship between PCOS and preterm delivery may therefore represent an interaction with assisted reproductive technologies. In our stratified analysis, the data did not support the assumption that poor pregnancy outcomes among women with PCOS were mediated by assisted reproductive technology. There was no significant connection between the combination of PCOS and assisted reproductive technologies and premature delivery. This suggests that PCOS is an autonomous risk factor for preterm birth. This conclusion is confirmed by two studies from Northern Europe [28], which found that premature birth related with assisted reproductive technology might be explained by variables that contribute to infertility, rather than the assisted reproductive technology.

Conclusion

Our findings indicate that PCOS increases the risk of GDM and premature delivery. Further longitudinal research is required to understand PCOS during gestation and create effective preventative measures to protect mother and child.

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