

Pregnancy Related Complications of Women with and without Polycystic Ovary Syndrome (PCOS): A Comparative Study

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Abstract

Aim: To study the pregnancy-related complications of women with and without PCOS in a tertiary care hospital in Patna.

Materials & Methods: The study population consists of two groups Test group (Pregnant woman with polycystic ovarian syndrome) and Control group (Pregnant woman without polycystic ovarian syndrome). The sample size for the study was calculated to be 140 (70 in each group), using the software N Master Version 2.0.

Results: The participants with overweight/obesity were 35.0% among the women with PCOS when compared to 25.0% among the women without PCOS ($p=0.392$). Even after adjusting for confounders like age, BMI and parity, there was 2.60 times higher risk among women with PCOS to have pre-eclampsia. Preterm delivery and LSCS was more among women without PCOS.

Conclusion: Women with polycystic ovary syndrome are at increased risk of adverse pregnancy and birth outcomes that cannot be explained by assisted reproductive technology. These women may need increased surveillance during pregnancy and parturition.

Keywords: Polycystic ovarian syndrome, gestational diabetes, pre-eclampsia, obesity

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Introduction

Polycystic ovary syndrome (PCOS) is a heterogeneous condition characterized by hyperandrogenism, ovarian dysfunction and polycystic ovarian morphology (PCOM). PCOS is more than just a reproductive disorder, and is currently considered a syndrome with metabolic consequences that could affect women's health during different stages of reproductive and post-reproductive life.[1,2]

The condition is characterized by oligo-ovulation or anovulation, biochemical or clinical hyperandrogenism, and polycystic ovaries. According to the Rotterdam consensus from 2003, the presence of two of three of these criteria fulfils a diagnosis of polycystic ovary syndrome.[3] The cause of polycystic ovary syndrome is not fully understood, but evidence of a genetic component has been recognized in family and twin studies.[4] Oligo-ovulation or

anovulation in women with polycystic ovary syndrome is a major cause of infertility, and such women might require ovulation induction or assisted reproductive technology to become pregnant.[5] Changes to lifestyle can, however, improve the metabolic and endocrine consequences of having polycystic ovary syndrome, thus possibly improving infertility caused by anovulation.[6]

PCOS adversely affects the health status of women of reproductive age group by increasing the chance of much chronic morbidity. Increased chance of glucose intolerance, obesity, type 2 Diabetes mellitus, psychiatric problems, cardiovascular diseases and sleep disorders are common in PCOS women. Women with PCOS are having more chance of having an ovulatory infertility and weight gain also adversely affects it.

Material & Methods:

A prospective cohort study of pregnant women aged 20-35 years attending the gynecology outpatient Department of Obstetrics & Gynecology, Nalanda Medical College & Hospital, Patna, Bihar, India for 1 year.

Inclusion and exclusion criteria

Pregnant women aged 20-35 years seeking obstetric care and provided informed consent were included in the study.

Woman with pre-existing medical conditions like Hypertension, Diabetes Mellitus, Hyperprolactinaemia, Antiphospholipid antibody syndrome, Systemic Lupus Erythematosus, thyroid disorders and those with twin gestation were excluded from the study.

Sample size and grouping

The study population consists of two groups Test group (Pregnant woman with polycystic ovarian syndrome) and Control group (Pregnant woman without polycystic ovarian syndrome). The sample size for the study was calculated to be 140 (70 in each group), using the software N Master Version 2.0.

Methodology

On obtaining the informed consent, the interview was conducted by the investigator herself. The data was collected using the standardized pretested structured interview schedule. Complete history and examination were done. Regular follow up of the participants up to delivery and pregnancy outcome in both test and control groups was undertaken.

Results:

The mean age of the participants was 25.3 years with a minimum of 20 years and a maximum of 34 years.

Table 1: Univariate and multivariable logistic regression analysis of risk factors and its association with PCOS (N=100)

Characteristics	Unadjusted PR (95% CI)	p value	Adjusted PR (95% CI)	p value
Age in years	0.96 (0.90-1.67)	0.642	1.09 (0.92-1.13)	0.720
Socio-economic status				
Lower	Reference		Reference	
Middle	1.14 (0.50-1.70)	0.198	1.37 (0.96-1.90)	0.329
Upper	-----	0.804	-----	0.859
BMI category				
Normal	1.01 (0.50-1.74)	0.909	1.80 (0.62-1.98)	0.872
Overweight	1.78 (0.80-2.87)	0.392	1.71 (0.52-2.01)	0.209

Obesity/Morbid obesity	Reference		Reference	
Parity				
Primi	2.72 (1.90-6.81)	0.003	2.99 (1.89-6.97)	0.002
Multi	Reference		Reference	
Mode of conception				
Spontaneous	Reference		Reference	
Ovulation induction/assisted	9.21 (0.90-70.2)	0.051	9.89 (0.11-237.1)	0.221

The participants with overweight/obesity were 35.0% among the women with PCOS when compared to 25.0% among the women without PCOS ($p=0.392$). Proportion of primigravida among women with PCOS was 86.0% and among women without PCOS was 51.0%. Primigravida were having 2.76 times higher chance of presenting with PCOS when compared to

the multigravida and it was found to be statistically significant. Mode of conception was spontaneous in 55.0% and 70.4% among women with and without PCOS, respectively.

IUI/IVF was the method of conception in 25.9% of women with PCOS, whereas only two women adopted IUI/IVF among the non-PCOS group. (Table-1)

Table 2: Univariate and multivariable logistic regression analysis of gestational diabetes mellitus and its association with PCOS and other risk factors (N=90)

Characteristics	Unadjusted PR (95% CI)	p value	Adjusted PR (95% CI)	p value
PCOS				
Yes	1.71 (0.60-3.01)	0.372	2.73 (1.71-2.01)	0.006
No	Reference		Reference	
BMI category				
Obesity/ Morbid obesity	12.73 (4.71-32.83)	<0.001	17.21 (6.92-47.02)	<0.001
Overweight	7.92 (3.45-23.92)	0.001	7.02 (2.92-21.93)	0.001
Normal	Reference		Reference	
Parity				
Primi	1.56 (0.92-4.92)	0.654	3.82 (2.81-7.82)	0.006
Multi	Reference		Reference	

Table 2 shows that the women who are overweight and obese/morbid obesity were found to have increased risk of GDM by 7.92 times and 12.73 times when

compared to the normal women and it was found to be statistically significant. Similarly, GDM was found to be 1.56 times higher in Primigravida compared to multigravida women.

Table 3: Univariate and multivariable logistic regression analysis of pre-eclampsia and its association with PCOS and other risk factors (N=90)

Characteristics	Unadjusted PR (95% CI)	p value	Adjusted PR (95% CI)	p value
PCOS				
Yes	2.98 (1.89-7.01)	0.065	2.60 (1.27-6.09)	0.031

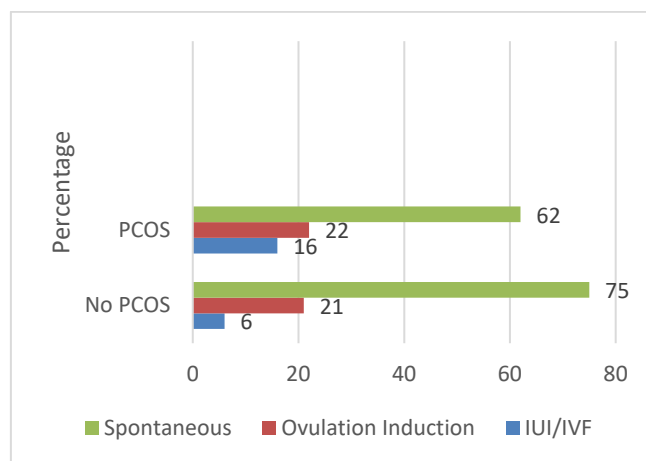
No	Reference		Reference	
Age in years	1.21 (1.00-1.44)	0.054	1.00 (1.00-1.03)	<0.001
BMI category				
Obesity/ Morbid obesity	8.92 (3.72-21.74)	<0.001	10.82 (5.93-25.27)	<0.001
Overweight	6.82 (2.1-16.83)	0.001	4.82 (2.09-12.93)	0.008
Normal	Reference		Reference	
Parity				
Primi	1.81 (0.51-4.82)	0.471	2.63 (1.51-1.80)	<0.001
Multi	Reference		Reference	

*Variables used in the model: PCOS, age, BMI and parity

Women with PCOS were having 2.98 [(1.89-7.01); p=0.065] times the higher risk of having preeclampsia. Even after

adjusting for confounders like age, BMI and parity, there was 2.60 times higher risk among women with PCOS to have pre-eclampsia. Similarly, as the age increases, the risk of pre-eclampsia also increases (Table-3).

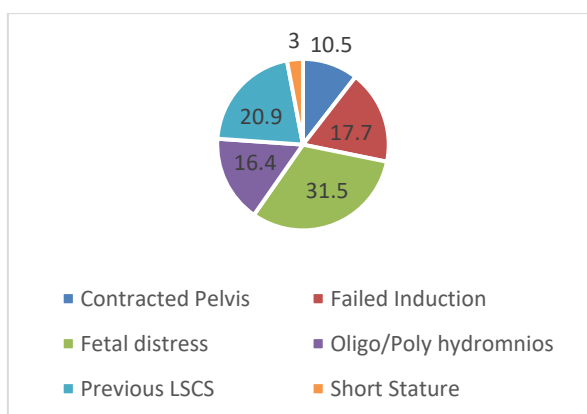
Fig 1: Distribution of the study participants by obstetric characteristics (Mode of conception) (N=100)



Mode of conception was spontaneous in 62% and 75% among women with and without PCOS, respectively. IUI/IVF was the method of conception in 22.0% of

women with PCOS, whereas only two women adopted IUI/IVF among the non-PCOS group.

Fig 2: Indications of LSCS among the study participants (N=70)



Preterm delivery and LSCS was more among women without PCOS. Fetal distress was the most common indication of LSCS (31.5%) followed by previous LSCS (20.9%) among the women who underwent LSCS. Short stature was the indication of LSCS only in 3.0% of women who underwent LSCS. Obese/morbid obese women were having 1.27 times higher risk of undergoing LSCS when compared to the normal women and it was found to be significant even after adjusting for confounders. Similarly, primigravida had higher risk of undergoing LSCS after adjusting for confounders.

Discussion:

An important issue in studying pregnancy complications in women with PCOS is the definition of the specific diagnostic features of PCOS, since the distinct variability in hormonal and metabolic abnormalities among various PCOS phenotypes could significantly influence the obstetric and neonatal outcomes observed.[7] The effect of obesity and/or IR and/or metabolic/hormonal abnormalities, which appear to vary across PCOS phenotypes, could play a crucial role.[8]

There was an interaction between assisted reproductive technology and polycystic ovary syndrome for preterm birth. Since women with polycystic ovary syndrome often need assisted reproductive technology or ovulation induction to become pregnant, the risk of multiple births increases, which is associated with preterm birth. In previous reports the strongest predictor for preterm birth in women with polycystic ovary syndrome was multiple birth.[9]

It is well founded that maternal obesity is associated with increased birth weight in offspring[10, 11] as well as glucose intolerance and gestational diabetes.[12] Women with polycystic ovary syndrome are in general more overweight than

women without the condition. The estimates in the present study were, however, adjusted for body mass index, suggesting that polycystic ovary syndrome may increase the rate of fetal growth independently. Women with polycystic ovary syndrome are, regardless of body mass index, at increased risk of developing gestational diabetes,[13]supported by our finding.

Alvarez-Blasco F et al[14] in his study in Spain has reported that the risk of PCOS was 5 times higher in obese women when compared to the normal women (28.3% vs. 5.5%, respectively). The study demonstrated the prevalence of PCOS may be markedly increased in overweight and obese women. This supports the widely accepted hypothesis that overweight and obesity are common among adolescent girls and adult women with PCOS.

Insulin resistance which is present in PCOS suppresses adipocyte lipolysis, resulting in increased serum free fatty acids and triglycerides, ultimately leading to increased hepatic de novo lipogenesis and hyperlipidaemia which in turn can lead on to obesity. However, there are studies showing different results too. In a study, girls related to women with PCOS showed higher 17-hydroxyprogesterone concentrations, increased insulin resistance and decreased insulin induced suppression of fatty acid concentrations compared with healthy controls. [15]

Women with PCOS also present a 3–4-fold increased risk of developing pre-eclampsia (PE) during pregnancy.[16] In the first study, a significantly increased risk of PE (OR3.18, 95%CI 2.18–4.62) was observed in women with PCOS, however, this effect faded (OR1.69, 95% CI 0.99–2.88) when adjusted for BMI and parity. [17]However, when data were analyzed for hyper androgenic women with PCOS only, a significantly (OR 2.41, 95% CI 1.26–4.58) increased risk of PE was found.[17] The second study was a

case-control study showing a significantly increased risk of PIH and PE in a heterogeneous population of women with and without PCOS (12.7 and 8% versus 5.3 and 2%, respectively).[18]

In one study [19] the risk of being born small for gestational age in the offspring of women with polycystic ovary syndrome was increased, whereas this could not be confirmed in other studies.[20-22]

There was no association of PCOS with the preterm delivery in our study. One of the well-known risk factor for pre-term delivery is pre-eclampsia which is common in women with PCOS. That might well explain the plausibility of pre-term babies in PCOS women, apart from numerous other causes. Our study shows that women with PCOS were having lesser risk for caesarian delivery, which is contrary to the available literature. [23-25]

Conclusion

Women with polycystic ovary syndrome are at increased risk of adverse pregnancy and birth outcomes that cannot be explained by assisted reproductive technology. These women may need increased surveillance during pregnancy and parturition.

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