Original Article

The Pregnancy Outcome in Women with Polycystic Ovary Syndrome

Most Nasrin Nigger[1], Sheuly Akhter[2], Ummul Nusrat Jahan[3], Aeysha Begum[4]

Abstract

Background: *In women of reproductive age, polycystic ovarian syndrome (PCOS) is a prevalent endocrine condition. Menstrual irregularities (oligomenorrhea or amenorrhea), hirsutism, persistent acne, androgen-dependent alopecia, abdominal obesity, hypertension, and infertility are all clinical signs of PCOS.*

Objective: *To assess the success of pregnancy in patients with polycystic ovary syndrome.*

Materials and Methods: *This observational cross-sectional study was carried out in the Department of Obstetrics and Gynaecology at Khwaja Yunus Ali Medical College and Hospital, Enayetpur, Sirajganj, Bangladesh from June 2020 to May 2022 for a period of two years. Women diagnosed with PCOS were willing to participate in our study were recruited from obstetrics Out patient Department (OPD) and antenatal ward of Department of Obstetrics and Gynaecology at Khwaja Yunus Ali Medical College and Hospital. After obtaining an informed consent from them, a detailed interview schedule containing socio- demographic details, menstrual/marital/ obstetric/past/personal/ family history was taken.*

Results: *Concerning complications Preeclampsia was found in 5 (9.1%) of the PCOS patients but not in the non-PCOS patients. The differences in gestational age and mode of birth between the two groups were not statistically significant ($p>0.05$). Perinatal outcome: 21 (39.6%) PCOS patients were admitted to the Neonatal Intensive Care Unit (NICU), compared to 11 (20.0%) non-PCOS patients. Which of the two groups was statistically significant ($p<0.05$).*

Conclusion: *The present study suggested that preeclampsia is a relatively common condition, and complications such gestational hyperglycemia, gestational hypertension, and preeclampsia were frequent in the PCOS group. In comparison to the non-PCOS group, the PCOS group had considerably greater rates of low birth weight and NICU admission.*

Keywords: *Polycystic ovary syndrome, Pregnancy complications, Pregnancy outcomes.*

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Introduction

Polycystic ovary syndrome (PCOS) is a common endocrine disorder in women of childbearing age. The risk of pregnancy and neonatal complications in women with PCOS is debatable.[1] PCOS is one of the most common endocrine disorders, affecting 5%-15% of reproductive-age women, depending on the population investigated and the diagnostic criteria utilised. PCOS is characterised by oligo- or anovulation, hyperandrogenism, and polycystic ovaries.[2] The most common features of PCOS are abnormal ovulation, clinical or laboratory indices of increased androgen levels, and polycystic ovaries on ultrasonography. Clinical manifestations of PCOS are menstrual irregularity (oligomenorrhea or amenorrhea), hirsutism, persistent acne, androgen dependent alopecia, abdominal obesity, hypertension and infertility.[3] Although the exact origin of polycystic ovary syndrome is unknown, family and twin investigations have revealed evidence of a hereditary component. One of the main causes of infertility in women with polycystic ovary syndrome is oligo-ovulation or anovulation; in order to conceive, these women may need ovulation induction or assisted reproductive technology. However, lifestyle modifications can help with the metabolic and endocrine effects of polycystic ovarian syndrome, which may help with infertility brought on by anovulation.[4] To determine whether women with PCOS are more likely than those without to experience unfavourable obstetric

1. Assistant Professor, Department of Obstetrics & Gynaecology, Khwaja Yunus Ali Medical College and Hospital, Enayetpur, Sirajgonj, Bangladesh.
2. Associate Professor, Department of Obstetrics & Gynaecology, Khwaja Yunus Ali Medical College and Hospital, Enayetpur, Sirajgonj, Bangladesh.
3. Consultant, Department of Obstetrics & Gynaecology, BRB Hospital Limited, Dhaka, Bangladesh.
4. Registrar, Department of Obstetrics & Gynaecology, TMSS Medical College, Bogura, Bangladesh.

Corresponding author: Most Nasrin Nigger, Assistant Professor, Department of Obstetrics & Gynaecology, Khwaja Yunus Ali Medical College and Hospital, Enayetpur, Sirajgonj, Bangladesh. Cell Phone: +880 1792-868225, E-Mail: matinspb@yahoo.com

outcomes like stillbirth, premature birth, or a different kind of delivery. In order to determine the degree of confounding caused by each risk factor, we also added covariates step by step to a series of regression models in which confounders were already predetermined. Polycystic ovarian syndrome is a prevalent and significant cause of infertility, and understanding its involvement in predicting bad pregnancy outcomes is critical for risk stratification. As a result, we undertook this study to see if PCOS predicts greater pregnancy problems even after controlling for major factors. Given that PCOS is frequently accompanied with metabolic and endocrine problems.

Materials and Methods

This observational cross-sectional study was carried out in the Department of Obstetrics and Gynaecology at Khwaja Yunus Ali Medical College and Hospital, Enayetpur, Sirajganj, Bangladesh from June 2020 to May 2022 for a period of two years. Women diagnosed with PCOS were willing to participate in our study were recruited from obstetrics OPD and antenatal ward of Department of Obstetrics and Gynaecology at Khwaja Yunus Ali Medical College and Hospital. After obtaining an informed consent from them, a detailed interview schedule containing socio- demographic details, menstrual/marital/ obstetric/past/personal/ family history was taken. A detailed history regarding PCOS, time of diagnosis of polycystic ovary syndrome, criteria considered such as oligomenorrhea, ultrasound findings and testosterone levels in women with PCOS was noted. History of infertility and treatment taken for PCOS was recorded. Physical examination including height, weight, BMI, blood pressure, acanthosis nigricans and hirsutism was noted. The pregnancy was followed up monthly up to delivery. Maternal complications, mode of delivery and perinatal outcome were recorded as mentioned below. Data were entered in SPSS analyzed using SPSS version 23. Continuous variables included age, weight, gestational age and were expressed as mean ± SD as appropriate. Categorical variables studied were parity, various maternal and perinatal outcomes, and data were expressed as proportions.

Results

Table 1 shows that 4(7.3%) patients was found uterine and tubal factor in PCOS group and 27(49.1%) in non-PCOS group. The mean serum FSH was found 5.0±0.9 IU/L in PCOS group and 5.4±1.0 IU/L in non-PCOS group. The mean serum LH was found 5.3±1.3 IU/L in PCOS group and 3.6±0.8 IU/L in non-PCOS group. The mean serum testosterone was found 0.5±0.2 ng/ml in PCOS group and 0.3±0.1 ng/ml in non-PCOS group. The mean fasting insulin was found 10.6±1.9 mU/ml in PCOS group and 9.6±2.1 mU/ml in non-PCOS group. Which were statistically significant ($p<0.05$) between two groups. Table 2 shows that 5(9.1%) patient was found preeclampsia in PCOS group and not found in non-PCOS group. Which was statistically significant ($p<0.05$) between two groups. Table 3 shows that gestational age and mode of delivery were not statistically significant ($p>0.05$) between two groups. Common indication of indication of caesarean section were Previous CS, Preeclampsia, Prolonged labour and Fetal distress in PCOS patients which were 7(38.89%), 5(27.78%), 3(16.7%) and 3(16.7%)respectively. Table 4 shows that 21(39.6%) patient was found NICU admission in PCOS group and 11(20.0%) in non-PCOS group. Which was statistically significant ($p<0.05$) between two groups. Among 2 babies had still birth one had preeclamsia and another had gestational hypertension.

Table I: Maternal characteristics of the study population (n=110)

Variables	PCOS (n=55)		Non-PCOS (n=55)		P value
	n	%	n	%	
Age (years)					
≤30.0	27	49.1	29	52.7	
31-40	28	50.9	26	47.3	
Mean±SD	30.1±4.6		29.4±4.9		$^{a}0.442^{ns}$
Type of infertility					
Primary	36	65.5	34	61.8	$^{b}0.692^{ns}$
Secondary	19	34.5	21	38.2	
Infertility factors					
Uterine and tubal factor	4	7.3	27	49.1	
Ovulatory disorders	42	76.4	1	1.8	
Endometriosis	2	3.6	4	7.3	$^{b}0.001^{s}$
Female and male factor	6	10.9	6	10.9	
Unexplained	1	1.8	17	30.9	
Mean BMI (kg/m^2)	25.0±5.4		24.9±5.6		$^{a}0.924^{ns}$
S. FSH level (IU/L)	5.0±0.9		5.4±1.0		$^{a}0.029^{s}$
S. LH level (IU/L)	5.3±1.3		3.6±0.8		$^{a}0.001^{s}$
S. Testosterone (ng/ml)	0.5±0.2		0.3±0.1		$^{a}0.001^{s}$
Fasting glucose (mmol/L)	5.2±0.5		5.1±0.6		$^{a}0.345^{ns}$
Fasting insulin (mU/ml)	10.6±1.9		9.6±2.1		$^{a}0.010^{s}$
Parity					
Primi	22	40.0	26	47.3	$^{b}0.442^{ns}$
Multi	33	60.0	29	52.7	

Table II: Complications of the study population (n=110)

Complications	PCOS (n=55)		Non-PCOS (n=55)		P value
	n	%	n	%	
Gestational diabetes	2	3.6	0	0.0	0.153^{ns}
Gestational hypertension	3	5.5	1	1.8	0.308^{ns}
Preeclampsia	5	9.1	0	0.0	0.022^{s}

Table III: Outcome of the study population (n=110)

Variables	PCOS (n=55)		Non-PCOS (n=55)		P value
	n	%	n	%	
Gestational age (weeks)					
Preterm	16	29.1	10	18.2	0.178 ns
Term	39	70.9	45	81.8	
Mode of delivery					
Caesarean section	18	32.7	11	20.0	0.130 ns
SVD	37	67.3	44	80.0	
Indication of Caesarean section					
Fetal distress	3	16.67	1	9.09	
Prolonged labour	3	16.67	2	18.18	0.41 ns
Previous CS	7	38.89	8	72.73	
Preeclampsia	5	27.78	0	0.00	

Table IV: Perinatal outcome of the study population (n=110)

Variables	PCOS (n=55)		Non-PCOS (n=55)		P value
	n	%	n	%	
Outcome					
Live birth	53	96.4	55	100.0	0.154 ns
Still birth	2	3.6	0	0.0	
Birth weight (kg)					
<2.5	19	35.8	10	18.2	0.038 s
2.5-4.0	34	64.2	45	81.8	
NICU admission					
Yes	21	39.6	11	20.0	0.026 s
No	32	60.4	44	80.0	

Discussion

In this study observed that 4(7.3%) patients was found uterine and tubal factor in PCOS group and 27(49.1%) in non-PCOS group. The mean serum FSH was found 5.0±0.9 IU/L in PCOS group and 5.4±1.0 IU/L in non-PCOS group. The mean serum LH was found 5.3±1.3 IU/L in PCOS group and 3.6±0.8 IU/L in non-PCOS group. The mean serum testosterone was found 0.5±0.2 ng/ml in PCOS group and 0.3±0.1 ng/ml in non-PCOS group. The mean fasting insulin was found 10.6±1.9 mU/ml in PCOS group and 9.6±2.1 mU/ml in non-PCOS group. Which were statistically significant (p<0.05) between two groups. Liu et al.[2] reported the PCOS population was more frequently diagnosed with primary infertility (66.8% vs. 51.2%; P<0.001). More ovulatory disorders (73.4% vs. 0.5%; P<0.001), higher baseline LH level (5.8 vs. 3.6 IU/L; P<0.001) and lower FSH level (5.1 vs. 5.6 IU/L; P<0.001) were found in the PCOS group compared with the control group. Women with PCOS had significantly higher total T level (0.5 vs. 0.3 ng/ml, P<0.001) than women without PCOS. Fasting glucose (5.2 vs. 5.1 mmol/L, P<0.001) and fasting insulin (10.7 vs. 9.5 mU/ml, P<0.001) were significantly higher in PCOS group. Mann et al.5 also observed the mean age was 26.8 years, 77% had high BMI and 88% had history of primary infertility in PCOS group. Roos et al.[4] reported women with polycystic ovary syndrome were more likely to be nulliparous than women with no such diagnosis (53.0% vs 43.8%, P<0.001). Women with polycystic ovary syndrome had an almost doubled prevalence of a body mass index greater than 25.0 (60.6% and 34.8%, P<0.001). Valdimarsdottir et al.[6] reported the mean age was found 31.7±4.6 years in PCOS and 30.2±5.1 years in non-PCOS group. The difference was statistically significant (P = 0.002).

Present study observed that 5(9.1%) patient was found preeclampsia in PCOS group and not found in non-PCOS group. Which was statistically significant (p<0.05) between two groups. Liu et al. reported GDM is the most commonly described pregnancy complication in women with PCOS. The early diagnosis and treatment could significantly reduce the incidence and severity of related maternal and neonatal complications.[7] Mann et al.[5] reported gestational diabetes 14.1% and pre-eclampsia 3.7% cases in PCOS group. However, a lower incidence of GDM ranging from 7.2% to 8% has been found in other studies.[8-10] Two other studies in contrast showed a higher incidence of GDM of 22% in PCOS pregnant women.[11-12] A 2–fourfold increase in hypertension/preeclampsia has been described in five meta-analyses on pregnancy outcome in women with PCOS.[1,13] Roos et al.[4] reported there was also a strong association between polycystic ovary syndrome and pre-eclampsia (1.45, 1.24 to 1.69) and very preterm birth (2.21, 1.69 to 2.90). Women with polycystic ovary syndrome had an 18% higher risk of undergoing caesarean section (both emergency and elective) compared with women without polycystic ovary syndrome. Valdimarsdottir et al.[6] observed women with PCOS developed preeclampsia more often than women who did not have PCOS (n = 11 [6.9%] versus n = 6 [1.9%]; P = 0.005). Valdimarsdottir et al.6 reported women with PCOS developed preeclampsia more often than women who did not have PCOS (n = 11 [6.9%] versus n = 6 [1.9%]; P = 0.005).

In this study, PCOS was more likely to deliver prematurely (29.1%) than the non-PCOS group (18.2%), and caesarean section delivery was higher in the PCOS group (32.7%) than the non-PCOS group (20%), but the difference was not statistically significant. Liu et al.[2] reported women with PCOS were more prone to deliver preterm (<37 weeks) than the control group (26.5% vs. 21.9%; P=0.039). The delivery type (cesarean or eutocia) exhibited no difference between these two groups (P=0.967). Two meta-analyses demonstrated that women with PCOS have a 2-fold increased risk of preterm delivery[14,15]

whereas another meta-analysis demonstrated no effect.[13] In a large Swedish study, infants born to mothers with PCOS were more frequently delivered prematurely (OR 2.21, 95% CI 1.69–2.90).[16] Another cohort study confirmed an increased risk of preterm delivery (OR 2.02, 95% CI 1.13–3.61).[17] Mann et al.5 reported preterm delivery was found 10.4% and caesarean delivery was 30.4% cases in PCOS group. Subramanian et al.[18] reported the delivery records of women with and without a pre-existing diagnosis of PCOS, 7.63% and 6.82% of them were delivered preterm, resulting in 13% increased crude odds of preterm delivery among women with PCOS compared to women without PCOS [OR 1.13 (95% CI 1.07–1.19)].

In this study, two patients in the PCOS group experienced stillbirths and none in the non-PCOS group. Low birth weight was higher in the PCOS group (35.8%) than in the non-PCOS group (18.2%), which is statistically significant. NICU admission was higher in the PCOS group (39.6%) than in the non-PCOS group (11%), and the difference was statistically significant. Liu et al.[2] reported the implantation rate, clinical pregnancy rate and live birth rate were significantly higher in the PCOS group compared with the control group (49.3% vs. 38.1%, 70.9% vs. 59.8%, 58.3% vs. 52.1%, respectively; P<0.001, P<0.001, P=0.002, respectively). Mann et al.[5] reported low birth weight babies was found 2%, low APGAR score at 5 min 13% and perinatal mortality 2% in PCOS group. NICU admission of babies born to pregnant women with PCOS was 20%. A lower incidence of 8%–14% has been described in some studies,[8,11] whereas a higher incidence of 25%-30% has been found in other studies.[1,9,12] Subramanian et al.[18] reported the proportion of low birth weight (<2500 g) was significantly higher among deliveries of women with PCOS compared to women without PCOS (5.90% vs 5.35%), with an 11% increase in the crude odds of low birth weight [OR: 1.11 (1.05–1.18)].

Conclusion

PCOS is mostly caused by ovulatory abnormalities. Significantly greater levels of S. FSH (IU/L), S. LH (IU/L), S. Testosterone (ng/ml), and Fasting insulin (mU/ml) were seen in the PCOS group compared to the non-PCOS group. Preeclampsia is a relatively common condition, and complications such gestational hyperglycemia, gestational hypertension, and preeclampsia were frequent in the PCOS group. Women with PCOS who develop GDM, also known as gestational hypertension and preeclampsia, may be at greater risk for fetal outcome. After controlling for differences in maternal age, parity, BMI, and time to conception, polycystic ovarian syndrome predicts an increased risk of unfavorable pregnancy outcomes. This new knowledge could be useful in advising and monitoring women with PCOS.

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