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Maternal and Perinatal outcomes in woman with polycystic ovarian syndrome: A District Lever Hospital Experiences

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Abstract
Background: Polycystic ovarian syndrome (PCOS) is the most common endocrine disorder affecting women of reproductive age, with a global prevalence ranging from 2% to 26%. This variation is influenced by sample diversity, socioeconomic status, and healthcare access. PCOS is associated with irregular menstruation, reduced fertility, insulin resistance, diabetes, and elevated androgen levels, leading to complications like cardiovascular events and psychological issues. During pregnancy, PCOS can exacerbate insulin resistance, increasing the risk of gestational diabetes, preeclampsia, and adverse perinatal outcomes, including preterm birth and congenital abnormalities. The condition's impact varies significantly depending on individual traits and phenotypes.
Aim of the study: The study aims to assess the maternal and perinatal outcomes in women with PCOS.
Methods: This descriptive study involved 52 pregnant women with PCOS at the Department of Gynecology and Obstetrics, District Hospital in Bagerhat, Bangladesh, from January 2023 to December 2023. Approved by the Institutional Ethics Committee, it included consenting pregnant women with PCOS and excluded those without consent or with other obstetric complications. Data collection involved comprehensive interviews covering sociodemographic details, medical history, PCOS diagnosis criteria, and treatment history. Physical examinations measured blood pressure, BMI, height, and weight. Pregnancy was monitored monthly until birth, with records of delivery mode, perinatal outcomes, and maternal issues.
Result: The average age of women was 25.07 years. Mean height, weight, and BMI were 145 cm, 67.59 kg, and 27.75 kg/m². 13.46% had a family history of diabetes, and 51.92% had a family history of cardiovascular disease. Most women (69.23%) had no prior pregnancies, and 76.92% had never given birth. None smoked or consumed alcohol. Gestational hypertension affected 17.31%, and pre-eclampsia 5.77%. GDMA1 and GDMA2 were present in 9.62% and 13.46%. Delivery outcomes included 82.69% term, 46.15% induced labor, 63.46% vaginal deliveries, and 36.54% cesarean sections. Newborn survival was 96.15%, with 21.15% admitted to NICU. 82.69% had high APGAR scores.
Conclusion: The study on maternal and perinatal challenges in women with PCOS both confirms and questions existing beliefs. It emphasizes the need for extensive, long-term cohort studies to better understand the complex relationship between PCOS and pregnancy outcomes, enhancing knowledge of potential risks for mothers and fetuses.

Keywords: Maternal, perinatal outcome, and polycystic ovarian syndrome

Introduction

Polycystic ovarian syndrome (PCOS) is known as the most common endocrine disorder affecting women in their reproductive years [1]. The global distribution of PCOS prevalence has recently been examined across different regions. Estimates of PCOS prevalence typically range from 2% to 26% [2]. Variations in sample diversity, socioeconomic status, access to medical care, the prevalence of key risk factors, and levels of health and education awareness may contribute to significant geographical differences in the rate of PCOS prevalence [3]. Depending on ancestral or geographical separation, populations worldwide exhibit distinct physical, social, and behavioral characteristics due to natural selection and adaptation to their environments. These conditions significantly impact the phenotype of diseases, including PCOS [4]. Despite being widespread, PCOS is a condition with an uncertain cause, differing diagnostic standards, broad clinical consequences, and contested treatment approaches. In non-pregnant women, PCOS is linked to irregular menstruation, reduced fertility, insulin resistance, diabetes, and

elevated levels of androgens [5]. Long-term complications of PCOS include a range of symptoms such as cardiovascular events, endometrial cancer, and psychological issues like stress and depression [4]. Pregnancy involves numerous metabolic and hormonal changes, and the presence of polycystic ovary syndrome (PCOS) can impact this process [6]. Pregnant women who do not have PCOS experience a naturally occurring state of insulin resistance [7, 8]. When combined with PCOS, this inherent insulin resistance can intensify, potentially resulting in gestational diabetes mellitus and its associated complications. Moreover, women with PCOS often have low levels of insulin-like growth factor-binding globulin-1, which may play a role in preeclampsia and fetal growth abnormalities [9]. PCOS is not just associated with metabolic disorders, irregular menstruation, or infertility, as traditionally thought. There is increasing acknowledgment that adverse pregnancy outcomes, such as gestational diabetes mellitus (GDM), preterm birth, issues with neonatal birth weight, and higher rates of cesarean sections, are all connected to PCOS during pregnancy [10, 11]. The increased risk of negative outcomes shows considerable variability depending on the specific traits and phenotypes related to PCOS [12]. Literature reports on perinatal risks include delivering babies who are small for gestational age, macrosomia, meconium aspiration syndrome, low APGAR scores at 5 minutes, NICU admissions, and perinatal mortality [13]. Moreover, one study indicates that patients with PCOS have an increased risk of congenital abnormalities [13]. However, there is contradictory evidence, as some studies have not found a higher risk of congenital abnormalities in women with PCOS. Therefore, the exact outcome in this context remains uncertain. The proposed study aims to assess the maternal and perinatal outcomes in women with PCOS.

Methodology & Materials

This descriptive study was performed on 52 pregnant women with PCOS. It was carried out at the Department of Gynecology and Obstetrics in a 250-bed District Hospital in Bagerhat, Bangladesh, from January 2023 to December 2023. The study protocol was approved by the Ethics Committee of the Institution.

- **Inclusion criteria**

Pregnant women with a diagnosis of PCOS and patients who gave consent to participate in the study were included.

- **Exclusion criteria**

Patients who did not consent and those with other obstetric complications were excluded.

Data Collection

A thorough interview schedule, including sociodemographic information, menstrual, marital, obstetric, previous, personal, and family history, was obtained after the participants gave informed consent. A thorough medical history was taken, including the period of PCOS diagnosis and criteria taken into consideration (e.g., oligomenorrhea, ultrasound results, and testosterone levels in PCOS-affected women). It was noted that the patient had been treated for PCOS and had a history of infertility. Blood pressure, BMI, height, and weight were measured during the physical examination. Up to birth, pregnancy was checked monthly. Records were kept on the mode of delivery, perinatal outcome, and maternal problems. MS Excel was used to enter the data

Statistical Analysis

All data were analyzed using the Statistical Package for the Social Sciences (SPSS) software (SPSS), version 21.0. The mean ± standard deviation and the frequency and rate, respectively, were measured for the quantitative and qualitative variables. Age, weight, and gestational age were examples of continuous variables. Parity and a variety of outcomes were categorical variables under investigation.

Results

The average age of women was 25.07 years. Mean height, mean weight, and mean BMI were recorded as 145 cm, 67.59 kg, and 27.75 kg/m2, respectively (Table 1). 13.46% of the patients had a first-degree family history of diabetes mellitus (DM), while 51.92% had a first-degree family history of cardiovascular disease (CVD). The majority of patients (69.23%) had not been pregnant before, with smaller percentages having experienced one (21.15%), two (5.77%), or three or more pregnancies (3.85%). Parity data indicated that most patients (76.92%) had never given birth, while others had one (17.31%), two (3.85%), or three or more children (1.92%). None of the patients had a positive history of smoking or alcohol consumption (Table 1). Hypertension was observed in the form of gestational hypertension in 17.31% of patients and pre-eclampsia in 5.77%. Diabetes outcomes included GDMA1 in 9.62% and GDMA2 in 13.46% of patients. Obstetric complications such as abortion (5.77%), IUGR/SGA (1.92%), and rupture of membranes such as PPROM in 19.23% and PROM in 34.62%) were observed. Regarding delivery, most pregnancies reached term (82.69%), while 15.38% were preterm and 1.92% were post-term. 46.15% of patients experienced induced labor, while 40.38% had spontaneous labor. The mode of delivery was spontaneous vaginal delivery (SVD) in 63.46% of cases and cesarean section in 36.54% (Table 2). Table 3 shows that most newborns were born alive, with a survival rate of 96.15%. The birth weight of most newborns fell within the range of 2500-2999 gm (30.77%) and 3000-3499 gm (23.08%). 82.69% of newborns had APGAR scores of 8/9 or higher. NICU admission was required for 21.15% of the newborns. Meconium-stained liquor was found in 7.69% of births (Table 3).

Table 1: Characteristics of the patients (n=52).

Patient characteristics	N	%
Age (average years± SD)	25.07±3.2	
Mean height (cm)	145	
Mean weight (kg)	67.59	
Mean BMI (kg/m2)	27.75	
First-degree family history of DM	7	13.46
First-degree family history of CVD	27	51.92
Gravidity		
0	36	69.23
1	11	21.15
2	3	5.77
3 or more	2	3.85
Parity		
0	40	76.92
1	9	17.31
2	2	3.85
3 or more	1	1.92
Positive history of smoking or alcohol consumption	0	0

Table 2: Maternal outcome among the study subjects (n=52).

Characteristics	N	%
Maternal outcomes		
Hypertension		
Gestational hypertension	9	17.31
Pre-eclampsia	3	5.77
Diabetes		
GDMA1	5	9.62
GDMA2	7	13.46
Obstetric		
Abortion	3	5.77
IUGR/SGA	1	1.92
Rupture of membranes		
PPROM	10	19.23
PROM	18	34.62
Preterm labor	7	13.46
Delivery Period of gestation		
Preterm	8	15.38
Term	43	82.69
Post-term	1	1.92
Nature of labor		
Induced	24	46.15
Spontaneous	21	40.38
Mode of delivery		
SVD	33	63.46
Cesarean section	19	36.54

Table 3: Perinatal outcome in the study subjects (n=52).

Status of newborn	N	%
Alive	50	96.15
Stillbirth	1	1.92
Neonatal death	1	1.92
Birth weight of newborn (gm)		
<1000	1	1.92
1001-1499	3	5.77
1500-1999	5	9.62
2000-2499	9	17.31
2500-2999	16	30.77
3000-3499	12	23.08
3500-3999	5	9.62
>4000	1	1.92
APGAR score		
0/0	1	1.92
<8/9	6	11.54
≥8/9	43	82.69
NICU admission	11	21.15
Congenital anomaly	1	1.92
Meconium-stained liquor	4	7.69

Discussion

Several studies have assessed the impact of PCOS on pregnancy outcomes in women, but the results have been mixed. In this study, the mean age of the patients was 25.07 years, with a standard deviation of 3.2 years. Consistent with earlier studies, 4.1% of the pregnant women were aged 35 and older [13-16]. In this series, the participants had an average BMI of 27.75 kg/m2. In contrast, a retrospective cohort study found that overweight individuals had a high mean BMI of 30.8 kg/m2, which was higher than the BMI of women with average weight [14]. According to our study, 13.46% of patients had a first-degree relative with diabetes, while 51.92% had a first-degree relative with cardiovascular disease. Additionally, most of the study participants were experiencing their first pregnancy, accounting for 69.23% of the group, which aligns with findings from other studies that reported a range of 47% to 81% [14, 17, 18]. Our study observed that the incidence of preeclampsia was 5.77% and hypertension was 17.31%, which is consistent with previous research. These percentages are similar to those found in earlier studies, though some research has indicated a lower range of 2.4% to 11% for hypertension and a higher range of 8-12% for preeclampsia [13, 14, 16, 19]. We found that 23.08% of participants were diagnosed with GDM, which aligns with the findings from another Indian case-control study involving 56 women with PCOS. Both studies show a similar prevalence of GDM [18]. However, other research has indicated a lesser rate of GDM fluctuating from 7.2% to 8% [13, 14, 20]. In our study, the incidence of SGA/IUGR babies among women with PCOS was 1.92%, which aligns with findings from another retrospective study [16]. This rate is lower than that of other research, which reported a higher prevalence of SGA/IUGR babies, ranging from 8% to 13% [13, 19]. No difference in risk of SGA/IUGR has been demonstrated in some studies [12, 17]. In the current study, 19.23% of women had membrane rupture during preterm gestation, while 34.62% experienced it during term gestation. The rate of preterm rupture aligns with results from a meta-analysis; however, the incidence of term rupture was much higher than the 8% reported in another retrospective study of 110 PCOS patients [15]. This discrepancy highlights the variability in reported rates across different studies [16]. The preterm delivery rate was 15.38%, which is higher than the rate found in a prospective Indian study of 56 women with PCOS. This suggests that preterm delivery rates vary across research studies [20]. Depending on our analysis, 63.46% of women had assisted vaginal delivery, while 36.54% underwent a cesarean section. The rate of cesarean sections in this series was lower than in prior studies, which reported a higher prevalence of cesarean sections, ranging from 39% to 64%. This variation highlights the differences in delivery modes across various studies [12, 13, 16, 20]. Of the 27 studies that included 4982 PCOS women, one meta-analysis showed no discernible change in risk [21]. In this study, (96.15%) of babies were born healthy and alive. 1.92 were stillborn, similar to an Australian study and another retrospective study (3%) [14, 19]. In this series, the frequency of babies with meager birth weight and meager birth weight was 5.77% and 1.92%, respectively. This is lower than the 4.9% to 11.4% range reported in two previous studies [13, 14]. 11.54% of babies born to pregnant women with PCOS had an APGAR of < 8/9 at 5 min, which is higher when compared to another Australian study, which found an incidence of 4.2% [13]. In our study, the NICU admission rate for babies born to pregnant women with PCOS was 21.15% [13, 19]. This rate is lower than the 25% to 30% reported in some studies but higher than the 8% to 14% described in other research [14, 16, 21]. The incidence of meconium-stained liquor in our study was 7.69%, slightly higher than that of other studies, which found an incidence ranging from 3.2 to 3.6% [16, 19]. Overall, the maternal and perinatal outcomes observed in this study highlight the potential risks associated with PCOS during pregnancy.

Limitations of the study: The study has a limited sample size and does not represent the diverse spectrum of women with PCOS, affecting the findings' generalizability. The study was not conducted on all relevant factors that could influence maternal and perinatal outcomes in women with PCOS, such as lifestyle factors, dietary habits, or specific fertility treatments.

Conclusion and recommendations

The data from our study shed further light on the current understanding of the maternal and perinatal challenges encountered by women with PCOS. While some of our findings

align with existing beliefs, others challenge the presumed risks associated with pregnancy and PCOS. It is essential to underscore the importance of conducting more extensive cohort studies with longer follow-up durations to thoroughly investigate the relationship between PCOS and the potential adverse outcomes for both mothers and fetuses during pregnancy. This approach would enhance our comprehension of the intricate aspects involved in pregnancies among women with PCOS.

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