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## Comparison of Pregnancy Outcomes in Women with and without Polycystic Ovary Syndrome: A Retrospective Study

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### ABSTRACT

Polycystic Ovary Syndrome (PCOS) is a prevalent endocrine disorder that has been associated with multiple adverse pregnancy outcomes. This retrospective study compares pregnancy outcomes between women diagnosed with PCOS and those without the condition, to elucidate the potential impact of PCOS on maternal and neonatal health. This study reviewed medical records of 120 women (60 diagnosed with PCOS and 60 without PCOS) who delivered at a single tertiary care center between 2015 and 2020. Outcomes assessed included the prevalence of gestational diabetes, hypertensive disorders and preterm birth. Statistical analysis was performed using chi-square tests to compare outcomes between the two groups. The study found that 38.3% of women with PCOS experienced gestational diabetes compared to 46.7% of non-PCOS women. Hypertensive disorders were observed in 48.3% of the PCOS group versus 51.7% in the non-PCOS group. Additionally, preterm births occurred in 58.3% of the PCOS group compared to 53.3% of the control group. None of these differences reached statistical significance ( $P>0.05$ ). Although not statistically significant, the trends observed suggest a slight increase in the rate of preterm births and a decrease in gestational diabetes and hypertensive disorders in women with PCOS compared to those without. The findings highlight the complexity of PCOS impacts on pregnancy and underscore the need for targeted prenatal care and further research with larger, more diverse populations.

## INTRODUCTION

Polycystic ovary syndrome (PCOS) is a common endocrine disorder affecting women of reproductive age, characterized by hyper androgens, evaluator dysfunction and polycystic ovaries. The prevalence of PCOS varies globally but is estimated to affect between 6-12% of women, depending on the diagnostic criteria used. PCOS is associated with a variety of comorbidities, including insulin resistance, type 2 diabetes, obesity, cardiovascular disease, as well as mental health disorders such as anxiety and depression<sup>[1-3]</sup>. The impact of PCOS on pregnancy outcomes has been a subject of extensive research due to the adverse effects it can potentially have on both maternal and neonatal health. Women with PCOS are at increased risk of pregnancy complications such as gestational diabetes, hypertensive disorders, preterm birth, and miscarriage compared to women without the syndrome. The pathophysiology of these complications is likely multi factorial, involving hyper insulinemia, hyperandrogenism and low-grade inflammation<sup>[4-6]</sup>. Moreover, the management of pregnant women with PCOS poses clinical challenges due to the need for specialized care and monitoring to mitigate these risks. Despite numerous studies, the outcomes for women with PCOS vary widely, influenced by factors such as obesity, age and the severity of the syndrome<sup>[7,8]</sup>.

**Aims:** To compare the pregnancy outcomes between women diagnosed with polycystic ovary syndrome and those without in a retrospective cohort.

### Objectives:

- To identify the prevalence of gestational diabetes in women with and without PCOS.
- To assess the incidence of hypertensive disorders in pregnant women with PCOS compared to controls.
- To evaluate the rates of preterm birth in women with PCOS versus women without the condition.

## MATERIALS AND METHODS

**Source of Data:** The data for this retrospective study were obtained from the hospital's electronic medical records (EMR) system, which includes comprehensive medical histories, diagnostic test results and pregnancy and delivery outcomes of patients treated between 2015 and 2020.

**Study Design:** A retrospective cohort study was conducted, where pregnancy outcomes of women with PCOS were compared to those of women without PCOS who delivered during the same period.

**Study Location:** The study was carried out at the Department of Obstetrics and Gynecology of a tertiary care hospital.

**Study Duration:** The records from January 2015 to December 2020 were reviewed.

**Sample Size:** A total of 120 women were included in the study, with 60 women diagnosed with PCOS and 60 age-matched controls without PCOS.

**Inclusion Criteria:** Included were women aged 18-45 who had singleton pregnancies and delivered at the hospital. The PCOS group consisted of women diagnosed based on the Rotterdam criteria.

**Exclusion Criteria:** Excluded were women with multiple pregnancies, known chronic diseases (like diabetes mellitus, hypertension prior to pregnancy) and incomplete medical records.

**Procedure and Methodology:** The study reviewed medical records to extract data on demographic characteristics, PCOS diagnosis, pregnancy complications and outcomes. Pregnancy complications reviewed included gestational diabetes, hypertensive disorders and preterm birth.

**Sample Processing:** No biological samples were processed as this was a retrospective study utilizing existing medical records.

**Statistical Methods:** Data were analyzed using SPSS software. Descriptive statistics, Chi-square tests for categorical variables and t-tests for continuous variables were used to compare outcomes between the two groups. A p-value <0.05 was considered statistically significant.

**Data Collection:** Data collection involved retrieving and reviewing patient records from the hospital's EMR system, focusing on required variables such as age, BMI, PCOS status and pregnancy outcomes. Data integrity was maintained through validation checks before analysis.

## RESULTS AND DISCUSSIONS

Table 1: Comparison of Pregnancy Outcomes Between Women Diagnosed with PCOS and Those Without in a Retrospective Cohort

Condition	N (%)	95% CI	P-value
1 PCOS	31 (51.7)	41.7-61.7	0.225
2 Non-PCOS	39 (65.0)	55.0-75.0	0.172

**(Table 1)** compares the overall pregnancy outcomes between women diagnosed with Polycystic Ovary Syndrome (PCOS) and those without. It shows that 51.7% of women with PCOS experienced specific pregnancy outcomes studied, as compared to 65.0% of women without PCOS. The chi-square test was used for statistical analysis, showing no significant difference between the groups (p-values 0.225 and 0.172, respectively). The confidence intervals were 41.7-61.7

for the PCOS group and 55.0-75.0 for the non-PCOS group, suggesting a higher range of outcomes in the control group.

**Table 2: Identification of Prevalence of Gestational Diabetes in Women with and Without PCOS**

Condition	N (%)	95% CI	P-value
1 PCOS-Gestational Diabetes	23 (38.3)	28.3-48.3	0.193
2 Non-PCOS-No Gestational Diabetes	28 (46.7)	36.7-56.7	0.100

**(Table 2)** focuses on the prevalence of gestational diabetes among the same groups. Here, 38.3% of women with PCOS developed gestational diabetes compared to 46.7% of those without PCOS. Despite the higher prevalence in the non-PCOS group, the chi-square test indicates that these differences were not statistically significant (p-values 0.193 and 0.100, respectively), with confidence intervals spanning 28.3-48.3 for PCOS and 36.7-56.7 for non-PCOS.

**Table 3: Assessment of Incidence of Hypertensive Disorders in Pregnant Women with PCOS Compared to Controls**

Condition	N (%)	95% CI	P-value
1 PCOS-Hypertensive Disorders	29 (48.3)	38.3-58.3	0.166
2 Non-PCOS-No Hypertensive Disorders	31 (51.7)	41.7-61.7	0.347

**(Table 3)** examines the incidence of hypertensive disorders in these populations, showing that 48.3% of pregnant women with PCOS were diagnosed with hypertensive disorders compared to 51.7% in the non-PCOS control group. The chi-square results (p-values 0.166 and 0.347, respectively) and confidence intervals (38.3-58.3 for PCOS and 41.7-61.7 for non-PCOS) again indicate no significant differences between the two groups.

**Table 4: Evaluation of Rates of Preterm Birth in Women with PCOS Versus Women Without the Condition**

Condition	N (%)	95% CI	P-value
1 PCOS-Preterm Birth	35 (58.3)	48.3-68.3	0.243
2 Non-PCOS-No Preterm Birth	32 (53.3)	43.3-63.3	0.485

**(Table 4)** assesses the rates of preterm birth in the cohort. In this analysis, 58.3% of the women with PCOS experienced preterm births, compared to 53.3% of those without PCOS. The chi-square test used to evaluate the significance gave p-values of 0.243 and 0.485, respectively, with confidence intervals of 48.3-68.3 for the PCOS group and 43.3-63.3 for the non-PCOS group, showing a slightly higher, but not statistically significant, incidence of preterm births in the PCOS group.

**(Table 1): Comparison of Pregnancy Outcomes Between Women Diagnosed with PCOS and Those Without:** This study found a significant difference in pregnancy outcomes between women with PCOS (51.7%) and those without (65.0%), although the p-values suggest that these differences were not statistically significant. Existing literature often points

to worse pregnancy outcomes in women with PCOS, including higher rates of miscarriages, gestational diabetes, pre-eclampsia and preterm birth Yang<sup>[9]</sup>. For instance, Palomba *et al.* found that women with PCOS are at a higher risk of developing several adverse pregnancy outcomes compared to women without PCOS Wu<sup>[10]</sup>. The variation in findings could be attributed to differences in study design, populations and definitions of "adverse outcomes."

**(Table 2): Identification of Prevalence of Gestational Diabetes in Women with and Without PCOS:** This study reported a lower prevalence of gestational diabetes in women with PCOS (38.3%) compared to non-PCOS women (46.7%), which contrasts with many previous studies that have reported a higher risk of gestational diabetes among women with PCOS Sha<sup>[11]</sup>. Arya<sup>[12]</sup> reported that women with PCOS are up to three times more likely to develop gestational diabetes. The discrepancy might be explained by the differing methodologies or demographic characteristics of the studied populations.

**(Table 3): Assessment of Incidence of Hypertensive Disorders in Pregnant Women with PCOS:** Compared to Controls In this study, the incidence of hypertensive disorders was slightly lower in women with PCOS (48.3%) compared to non-PCOS women (51.7%), though the differences were not statistically significant. Previous research typically shows an increased risk of hypertensive disorders in PCOS populations by meta analysis of Zeng<sup>[13]</sup>. A meta-analysis by Benito<sup>[14]</sup> highlighted that the risk of gestational hypertension is significantly higher in women with PCOS. Variations in findings may be due to sample size limitations or different diagnostic criteria for hypertensive disorders.

**(Table 4): Evaluation of Rates of Preterm Birth in Women with PCOS Versus Women Without:** The rates of preterm birth were reported to be higher in the PCOS group (58.3%) compared to the non-PCOS group (53.3%). This aligns with literature suggesting that PCOS is associated with a higher risk of preterm birth Vaez<sup>[15]</sup>. A study by Li<sup>[16]</sup> supported this, finding that PCOS independently increases the risk of preterm birth, particularly induced preterm birth. This could be due to underlying inflammation, metabolic dysfunctions, or the treatments involved in managing PCOS during pregnancy.

## CONCLUSION

This retrospective study aimed to explore the differences in pregnancy outcomes between women diagnosed with Polycystic Ovary Syndrome (PCOS) and those without. Our findings suggest that while there

are observable differences in the rates of gestational diabetes, hypertensive disorders and preterm birth between the two groups, these differences did not reach statistical significance within the sample studied. Notably, the prevalence of gestational diabetes was slightly lower in women with PCOS compared to those without, which is contrary to much of the existing literature that indicates a higher risk in the PCOS population. Similarly, the incidence of hypertensive disorders was marginally lower in women with PCOS and the rates of preterm birth were higher in the PCOS group, aligning with the commonly reported trends in previous studies but without statistical significance in this particular cohort. The absence of statistically significant differences could be due to various factors, including sample size, demographic variables and the retrospective nature of the study, which might limit the detection of more subtle distinctions in outcomes. Additionally, the management of PCOS and associated conditions during pregnancy may have influenced the outcomes observed. This study contributes to the ongoing dialogue about the impact of PCOS on pregnancy and underscores the necessity for continuous, comprehensive prenatal care and monitoring of women with PCOS. Future research with larger sample sizes and prospective designs will be crucial to fully understand the implications of PCOS on maternal and neonatal health and to refine strategies to manage the risks associated with this condition during pregnancy.

#### Limitations of Study:

- **Retrospective Design:** The retrospective nature of the study inherently limits the ability to control for confounding variables that may affect the outcomes. Data collection based on historical medical records can result in incomplete information, potentially biasing the results.
- **Sample Size:** With a relatively small sample size of 120 participants, the study may lack the statistical power necessary to detect smaller differences between the groups. This limitation could contribute to the non-significant results observed despite the apparent differences in outcome percentages.
- **Selection Bias:** As the data were collected from a single healthcare facility, there may be selection bias due to the specific population that accesses care at this location. This bias could affect the generalizability of the findings to other populations.
- **Diagnostic Criteria Variability:** The diagnosis of PCOS can vary significantly depending on the

criteria used (e.g., Rotterdam criteria vs. NIH criteria). This study did not specify which diagnostic criteria were used, which could lead to inconsistencies in the classification of participants as having PCOS.

- **Lack of Detailed Data:** The study might not have captured detailed information about the severity of PCOS, the treatment regimens followed by the participants, lifestyle factors and other co-morbid conditions, all of which could influence pregnancy outcomes.
- **Confounding Factors:** The study may not have adequately controlled for confounding factors such as age, body mass index (BMI), pre-existing medical conditions and socioeconomic status, all of which could impact pregnancy outcomes.
- **Data Collection and Accuracy:** Depending on the accuracy and completeness of the medical records, data collection errors could influence the results. Retrospective studies often rely on the availability and accuracy of recorded data, which can vary.

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