Original article

Determine the Potential Risk of High Blood Pressure Causes Abortion in Pregnancies with Polycystic Ovary Syndrome in Aljouf, Saudi Arabia

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Abstract

To determine the risk of abortion in pregnant women with and without concomitant PCOS. Between January 2021 and December 2021 in Sakaka, Aljouf, Saudi Arabia, we conducted a retrospective case control research on pregnant women with and without PCOS at the Obstetric department of Maternity and Children hospital (MCH). 174 pregnant women in total were separated into case (n = 149) and control (n = 25) based on the presence or absence of PCOS. Age, BMI, a history of PCOS, follow-up prenatal care, and natural conception were among the inclusion criteria. We evaluated initial diagnosis of PCOS in case group 18.1% in age 16-26, 65.7% in 27-36 and 16.1% in age 37-46. The mean BMI of case and control groups found 30.21 ± 1.2 and 23.24 ± 2.2 respectively. The age different of first pregnancy found higher significant in between them at p value =0.001. while history of abortion 42.2% higher in cases than controls (p=0.001). The 75.1 %, 61%, 85.2% history of hypertension, Dyslipidemia and Diabetes mellitus in case which indicated higher significant compared to the control (p =0.000). Multiple logistic regression using analysis identified some characteristics substantially connected to PCOS pregnancy that were: H/of abortion (adj. OR= 3.69, 95%CI: 1.35 to 9.61, p<0.001), H/of hypertension (adj. OR=4.59, 95%CI: 1.42 to 9.65, 0.000), H/of diabetes mellitus (adj OR= 2.67, 95%CI: 1.11 to 6.59, p=0.056) and as well as H/of Dyslipidemia (adj. OR=3.46, 95%CI: 1.89 to 6.87, p=0.000). The findings of the hospital-based study have shown that pre-pregnancy PCOS is a major and independent risk factor for a pregnant woman's eventual abortion.

Keywords: Abortion, PCOS, pregnant women

Introduction

The polycystic ovarian syndrome most frequently affects women who are of reproductive age. Following to the Rotterdam criteria, ovarian dysfunction was linked to one of the two following traits, which included high levels of androgen, long-standing anovulation, and abnormalities in ovarian shape [1,2]. By using ultrasound, several tiny ovarian follicles and a considerable ovarian volume were found in the ovaries. However, abortions occur often during pregnancy and can happen repeatedly. Due to chromosomal abnormalities, the first trimester of pregnancy is when abortions most frequently occur [3.] Although there were a number of risk factors for abortion in the first trimester, antiphospholipid antibody syndrome was thought to be less common. Modern, acceptable ultrasound technology is used to detect pregnancy complications early on [4]. additionally, to the abortion diagnosing technique of ultrasonography. Numerous research assessed the results of pregnancies with PCOS. While other research revealed that pre-pregnancy PCOS leads to pregnancy abortion [5,6]. However, there is a connection between PCOS and abortion because of a related inflammatory condition. Previous studies merely hinted that PCOS could lead to abortion, but no studies have compared abortion rates in obese and non-obese PCOS women. As a result, we will compare obese and non-obese PCOS women and ascertain the frequency of abortion.on references.

Methods
This is retrospective case control study on pregnant women associated with and without PCOS who conducted at the Obstetric Department of Maternity and Children hospital (MCH) over a duration of January 2021 and December 2021, Sakaka, Aljouf Saudia Arabia. A total of 174 pregnant women divided into cases (n=149) and control (n=25) groups based on PCOS and without of PCOS in pregnancy. The inclusion criteria included age, BMI, history of PCOS, follow -up prenatal care, natural conceive. Any chronic disease was excluded from out study.

Calculation of sample size
For this investigation, the sample size determination formula was utilized to estimate the minimal sample size.

$N = Z2 \times P (1 - P)/d2$

When n denotes the minimal sample size, P the predicted prevalence, Z the standard normal deviation, which corresponds to the 95% confidence limit (1.96), and 1 the alpha level of significance (5%), are all given. Using this method, the estimated sample size for this study was 149 pregnant women with PCOS and 25 without PCOS, respectively.

Data collection
We acquired information on all expectant mothers from hospital data record files, which also contained demographic information and laboratory test results.

Data analysis
Utilizing software from the SPSS 20.00 edition, data generated were examined. The level of significance was established at a p-value of 0.05 for the student t-test and ANOVA (Analysis of variance) used to compare means.

Results
In the current study, 174 pregnant women with and without polycystic ovarian syndrome were recruited. We split these participants into case (with PCOS) 149(85.6%) and control (without PCOS) 25(16.7%) groups, which are depicted in figure 1.

Demographic criteria of case and control groups
Our study focus age for initial diagnosis of PCOS in case group and found 18.1% in age groups 16-26, 65.7% in 27-36 and 16.1% in age between 37-46 years old pregnant women. The mean BMI of case and control groups found 30.21 ± 1.2 and23.24 ± 2.2 respectively, statistically significant at considered p=0.001. the mean age of first pregnancy 31.07±5.36 and 26.12±4.58 among case and control groups respectively, the age different of first pregnancy found higher significant in between them at p value =0.001. while history of abortion 42.2% and 24% detected in cases and controls at p value0.001 and represented with figure 2.

Associated of medical condition in both groups
The 75.1 %,61%,85.2% and 12 %,4%,8% history of hypertension, Dyslipidemia and History Diabetes mellitus in case and control groups respectively which indicated higher statistically significant in cases compared to the control and considered at p value =0.000.

Table 1. *Demographic criteria of study groups.*

Variables	With PCOS (n=149) %	Without PCOS(n=25) %	p-value
Initial diagnosis of PCOS by age (year)			
16-26	27 (18.1)	-	
27-36	98 (65.7)	-	
37-46	24 (16.1)	-	
Mean BMI (kg/m2)	30.21 ± 1.2	23.24 ± 2.2	0.001
Mean age of First pregnancy	31.07±5.36	26.12±4.58	0.001
History of abortion	63 (42.2)	6(24)	0.000
History of Hypertension	112(75.1)	3 (12)	0.000

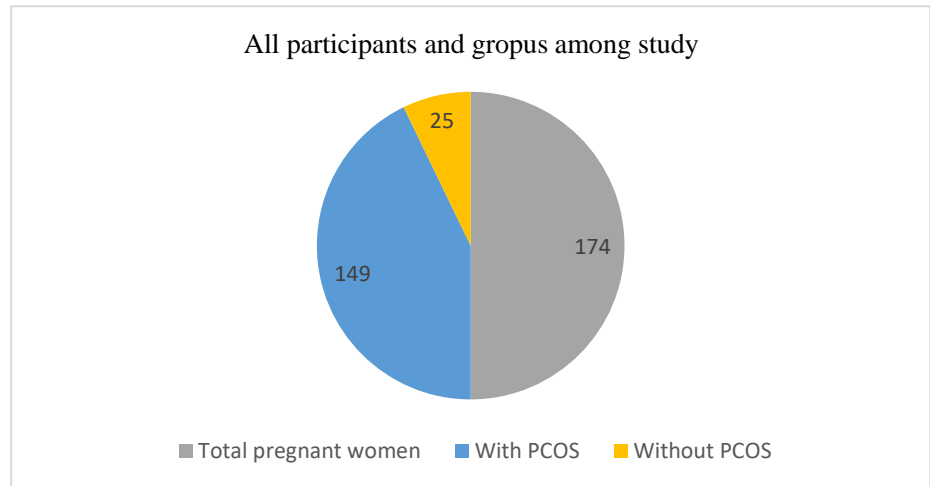| History Dyslipidemia | 91 (61) | 1 (4) | 0.000 |
| History Diabetes mellitus | 127 (85.2) | 2 (8) | 0.000 |

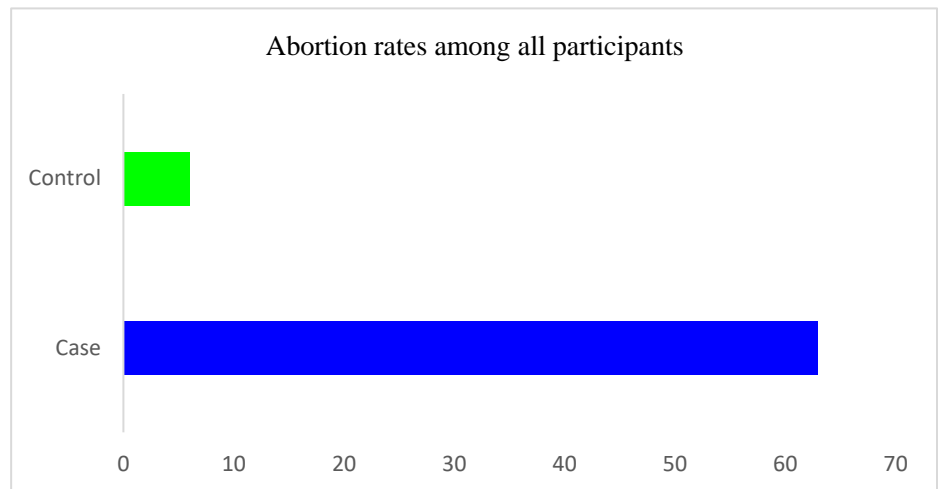Figure 1. with and without PCOS of total pregnancy in the study.

Figure 2. The rate of abortion found between case and control groups.

Study of laboratory reports and ultrasonography finding

With a p value of 0.001, all variables' laboratory results were statistically significantly higher in the cases than the controls (table2).

Table 2. laboratory reports among all participants

Variables	**Cases (n=149)**	**Control (n=25)**	**P values**
Systolic blood pressure (SBP)mmHg	133.5 ± 7.6	112.39 ± 11.2	0.001
Diastolic blood pressure (DBP)mmHg	85.21 ± 3.6	72.18 ± 2.13	0.001
HDL (mg/dl)	38.32 ± 6.53	54.48 ± 2.55	0.001
LDL (mg/dl)	109.1 ± 12.6	81.4 ± 5.1	0.001
Triglycerides(mg/dl)	99.80 ± 32.6	65.26 ± 8.6	0.001
FBG (mg/dl)	134.23 ± 15.2	83.10 ± 7.55	0.001

Table 3. Ultrasound assessment of endometrium thickness and number of follicles.

Variables	Mean ± SD	Median (IQR)
Total follicles number	7.41 ± 1.28	8.0 (6.0 – 8.0)
Follicles 14-18 mm	3.61 ± 0.77	4.0 (3.0 – 4.0)
Follicles ≥ 18mm	2.86 ± 1.10	3.0 (2.0 – 4.0)
Thickness of endometrium	10.79 ± 1.18	11.0 (10.0 – 12.0)
SD: Standard deviation and IQR: Interquartile range,		

By using ultrasonography, we were able to identify the variable endometrial thickness and number of follicles, which we then expressed with mean, standard deviation, and interquartile range (table 3). The follicles in figure 3 are depicted.

Figure 3. The numerous tiny necklace-like follicles occurring in both ovaries were discovered by ultrasound in patients with polycystic ovarian syndrome (A, B, C) [7].

Study of laboratory reports and ultrasonography finding
With a p value of 0.001, all variables' laboratory results were statistically significantly higher in the cases than the controls (table2).
By using ultrasonography, we were able to identify the variable endometrial thickness and number of follicles, which we then expressed with mean, standard deviation, and interquartile range (table 3). The follicles in figure 3 are depicted.

Multivariable analysis
Multiple logistic regression using multivariable analysis identified some characteristics substantially connected to PCOS pregnancy that were: H/of abortion (adj. OR= 3.69, 95%CI: 1.35 to 9.61, p<0.001), H/of hypertension (adj. OR=4.59, 95%CI: 1.42 to 9.65, 0.000), H/of diabetes mellitus (adj OR= 2.67, 95%CI: 1.11 to 6.59, p=0.056) and as well as H/of Dyslipidemia (adj. OR=3.46, 95%CI: 1.89 to 6.87, p=0.000), that all represent in table 4 and figure 4.
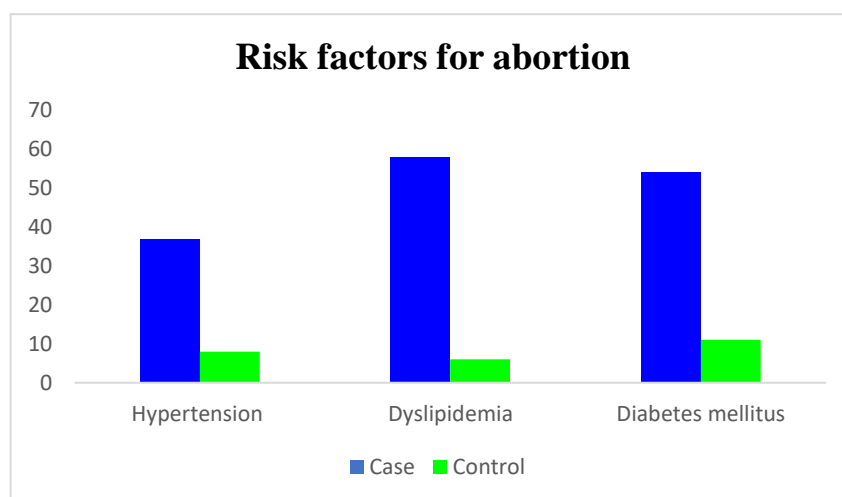
Figure 4. Associated risk factors for abortion among study groups.

Table 4. Analysis of Multivariable regarding risk factors for abortion in PCOS-related pregnancies.

Variables	Case (n=149)	Control (n=25)	Crude OR (95%CI)	Adjusted OR (95% CI)	P-value
History of abortion					p<0.001
Yes	63 (42.2))	6(24)	1	1	
No	86 (57.7)	19 (76)	2.29 (1.16 to 4.42)	3.69 (1.35 to 9.61)	
History of hypertension					0.000
Yes	112 (75.1)	3(12)	1	1	
No	37(24.8)	22(88)	3.18 (1.15 to 4.46)	4.59 (1.42 to 9.65)	
History of diabetes mellitus					0.056
Yes	127(85.2)	2 (8)	1	1	
No	22(14.7)	(92)	4.12 (1.86 to 8.34)	2.67(1.11 to 6.59)	
History of History Dyslipidemia					
Yes	91(61)	1 (4)	1	1	0.000
No	58 (38.9)	24 (96)	4.87 (1.99 to 9.10)	3.46 (1.89 to 6.87)	

Discussion

Using patient information from hospital records files, we are, to our knowledge, the first to do study on the likelihood of abortion in pregnant women with and without PCOS. The Obstetrics department of the Maternity and Children Hospital (MCH), Sakaka, Saudi Arabia, served as the site of this retrospective study. One hundred seventy-four pregnant women in total were studied and classified into case (n=149) and control (n=25) groups, such as PCOS with pregnancy and PCOS-without pregnancy. According to our study, a greater number of individuals 65.7 % between the ages of 27 and 36 were initially diagnosed with PCOS than people between the ages of 16 and 26, or between 37 and 46, or 18.1% and 16.1%, respectively. History of hypertension, dyslipidemia, and diabetes mellitus were detected in patients at 75.1%, 61%, and 85.2% respectively compared to controls, and this was given a p value of 0.001. Our results shown all laboratory reports (table-2) significantly increased on case group than controls (p=0.001). Our study examined the mean standard deviation of ultrasound-measured follicular status.

On the other hand, we found that women with PCOS had a history of abortion at a rate of 42.2% compared to 24% in the control group, which was statistically significant (p=0.000). When pregnancy symptoms favor abortion, ultrasonography frequently detects the abortion [8]. Considering that women with past PCOS are more likely to experience a subsequent miscarriage, they should get pertinent information and recommendations to help with

specialty referral and early care. Congenital abnormalities, autoimmune diseases, and low progesterone levels are a few common characteristics associated with both abortion and PCOS [9]. One of the causes of abortion is obesity. Additionally, antiphospholipid antibodies (aPL) and recurrent early pregnancy loss (EPL) have been associated [9]. The immunologic viewpoint is also supported by earlier research. Excessive or improper complement activation is linked to a number of pregnancy complications, including miscarriage, fetal growth restriction, gestational hypertension, and preterm birth. The pathogenetic mechanisms underlying PCOS-related miscarriages are still poorly understood, but LH, hyperinsulinemia, hyperandrogenism, inadequate glycodelin levels in endometrium, and hypofibrinolysis mediated by raised plasminogen activator inhibitor (PAI) activity may each play a separate or combined role [10]. The diagnoses of PCOS and miscarriage were made for all of the recruited women based on the medical findings of gynecologic ultrasonography or the outcomes of blood examination.

Conclusions

The findings of the hospital-based study have shown that pre-pregnancy PCOS is a major and independent risk factor for a pregnant woman's eventual abortion.

Conflicts of Interest

The authors declare no conflict of interest.

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