

A Study to Assess the Impact of Comorbid Poly Cystic Ovarian Syndrome on Maternal Outcomes among Postnatal Mothers - A Retrospective Cohort Study

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ABSTRACT:

Background: The ovaries are a female's reproductive organs that regulate the menstrual cycle and the secretion of hormones such as estrogen, progesterone, inhibin, relaxin, and others. The overabundance of eggs causes the ovary to enlarge and release high amounts of male hormone, resulting in infertility. PCOS is a hormonal condition that affects almost 5-10% of women in their childbearing ages (12 to 45-years). In this condition, the hormones of a woman go out of balance which makes various symptoms, including anovulation, irregular menstrual cycle, difficulty conceiving, weight gain, acne, and hirsutism.

Aim: To assess the maternal outcomes of PCOS and non PCOS among postnatal mother.

Materials and Methods: A retrospective cohort study was carried out in St, Joseph Hospital at Puducherry. A total of 132 (PCOS 66 and NON PCOS 66) samples were selected based on the inclusion criteria through convenience sampling technique. The data were collected from medical record department using check list and collected data were analyzed by descriptive and inferential statistics. Statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS, version 16).

Result: The study result revealed that women with PCOS are at increased risk of adverse maternal outcomes especially Pregnancy Induces Hypertension, Gestational Diabetic Mellitus, Thyroid problem, extended labour duration, Caesarean section ,low Apgar score(<7) and NICU admission of neonatal. **Conclusion:** The PCOS mother needs additional periodic medical consultants during pregnancy and childbearing.

Key words: Assess, Maternal Outcomes, NICU, PCOS, and Postnatal Mother

BACKGROUND:

Polycystic Ovarian syndrome is a condition in which the ovaries produce an abnormally high amount of androgens (Normal value of testosterone between 280 – 1,100 ng/dl for adult male and 15- 70 ng/dl for female), male sex hormones that are typically present in low

quantities in women. Polycystic ovarian syndrome is a disorder in which the ovaries generate an abnormally large number of tiny cysts (fluid-filled sacs).¹ this raises the likelihood of reproductive issues such as infertility, endometrial cancer, gestational diabetes, and mental health issues.²

PCOS symptoms occur immediately after puberty, diagnosis is often delayed due to a lack of proper knowledge and the lack of an effective screening programme. Early identification and care have been shown to considerably control the disease and reduce the chance of acquiring serious morbidities in the future. The presence of numerous cysts in the follicles of the ovary necessitates a hormonal investigation and an ultra-sonogram to establish the diagnosis of PCOS.³ Some of the pregnancy problems associated with PCOS include: Miscarriage or early pregnancy loss. Women with PCOS are three times more likely than women without PCOS to miscarry in the first three months of pregnancy.⁴

Pregnancy related hypertension, which is termed as rise in blood pressure that can occur in the second part of a pregnancy. It can progress to preeclampsia if not managed soon and impact on the baby's birth.⁴PCOS with pregnancy raised the risk of Gestational Diabetes Mellitus, PIH, preeclampsia, preterm birth, and cesarean section to mother, which had a detrimental influence on birth weight and increased the chance of admission to NICU.⁵PCOS affects around one in every five (20%) Indian women. If not treated in a timely manner, the disorder might have major health consequences.⁶For every five women in India, one can be diagnosed with Polycystic Ovarian Syndrome, according to a report published by metropolis healthcare.⁷

According to a research done by the AIIMS department of endocrinology and metabolism, around 20-25 percent of Indian women of reproductive age have PCOS. The prevalence of PCOS was estimated to be 9.13 percent in research done in South India and Maharashtra.⁸ In Pondicherry the incidence of PCOS among medical students was high. Rotterdam's criteria were used to confirm PCOS. The prevalence of PCOS was 11.76%. The most usual characteristics in people with PCOS were Oligomenorrhea alone or in associated with hirsutism.⁹

MATERIALS AND METHODS:

This was a retrospective study which was conducted at Pondicherry among the postnatal mothers (records) with and without PCOS to assess the maternal outcomes by using (self-structured) check list through convenience sampling technique 132 mother's records were selected from (MRD) Medical Record Department. Ethical clearance was obtained from the Institutional Human Ethical Clearance Committee of VMCON, Puducherry.

PROCEDURE:

The self-structured questionnaire to filled by researcher to collect socio demographic data, antenatal, intranatal, neonatal and postnatal outcomes.

The tool consists of two sections.

Section-A

It consists of demographic variables of the postnatal mother which includes age, education of the mother, occupation of the mother, family income, area of residence, occupation of the husband.

Section-B

It consists of check list for outcomes identification, which includes antenatal, intranatal, neonatal and postnatal check lists.

STATISTICS

Demographic variables in categorical/dichotomous were given in frequencies with their percentages. Similarity of demographic distribution among Non PCOS mothers and PCOS mothers group was tested using chi square test. Qualitative data Difference between Non PCOS mothers and PCOS mothers was analyzed using chi square test.

RESULT

In our study total number of the mother was 132 and most of them belong to, 41(62.12%) were aged between 23 -27 years, 53(80.3%) were educated up to degree and above, 32(48.4%) were private employed, 61(92.4%) were belongs to above Rs.30001 monthly family income, 44(66.67%) were urban area, 62(93.9%)were having the dietary habits of non-vegetarian, 43(65.15%) were belongs to private employed given in (table 1).

Table 1: Distribution of Study Subjects According to Demographic Variables

Demographic variables	group				Chi square test	square
	Non PCO mothers		PCO mothers			
	n	%	n	%		
Age in years	18-22 years	4	6.06%	6	9.09%	$\chi^2=6.07$ p=0.11 (NS)
	23-27 years	41	62.12%	27	40.91%	
	28-32 years	13	19.70%	22	33.33%	
	33-37 years	8	12.12%	11	16.67%	
Education of the mother	No formal education	0	0.00%	0	0.00%	$\chi^2=0.20$ p=0.90 (NS)
	Primary school	5	7.58%	4	6.06%	
	Higher secondary	10	15.15%	9	13.64%	
	Degree and above	51	77.27%	53	80.30%	

Occupation of the mother	Un employed	25	37.88%	24	62.12%	$\chi^2=0.07$ p=0.96(NS)
	Self employed	0	0.00%	0	0.00%	
	Private employed	32	48.48%	32	48.48%	
	government employed	9	13.64%	10	15.15%	
family income per month	Rs.1000-10000	0	0.00%	0	0.00%	$\chi^2=0.37$ p=0.55 (NS)
	Rs. 10001 – 20000	0	0.00%	0	0.00%	
	Rs.20001-30000	5	7.58%	5	7.58%	
	Rs.30001 and above	61	92.42%	61	92.42%	
Area of residence	Rural	29	43.94%	22	33.33%	$\chi^2=1.57$ p=0.21 (NS)
	Urban	37	56.06%	44	66.67%	
Food habits	Vegetarian	4	6.06%	5	7.58%	$\chi^2=0.12$ p=0.73 (NS)
	Non-Vegetarian	62	93.94%	61	92.42%	
Occupation of the husband	Un employed	0	0.00%	0	0.00%	$\chi^2=2.99$ p=0.22 (NS)
	Self employed	9	13.64%	4	6.06%	
	Private employed	43	65.15%	42	63.64%	
	government employed	14	21.21%	20	30.30%	

Table 2. Depicts that the distribution of study participants according to the antenatal outcomes of the mothers in PCOS and non PCOS group. There was significant between PCOS mother with PIH, GDM and thyroid problem with chi square value of $\chi^2=8.89$, $\chi^2=75.76$, $\chi^2=4.79$ at $p<0.05$ level.

Table 2: Distribution of study participants according to the antenatal outcomes of mothers in PCOS and NON PCOS group

Antenatal outcomes	Non PCOS mothers		PCOS mothers		Chi square test	
	n	%	n	%		
Pregnancy Induce Hypertension (PIH)	Yes	7	10.61%	21	31.82%	$\chi^2=8.89$ p=0.01** (S)
	No	59	89.39%	45	68.18%	
Gestational Diabetic mellitus	Yes	8	12.12%	58	87.88%	$\chi^2=75.76$ p=0.001*** (S)
	No	58	87.88%	8	12.12%	
Thyroid problem	Yes	1	1.52%	7	10.61%	$\chi^2=4.79$ p=0.05 * (S)
	No	65	98.48%	59	89.39%	
Placentaprevia	Yes	0	0.00%	1	1.52%	$\chi^2=1.01$ p=0.32 (NS)
	No	66	100.00%	65	98.48%	

Abrupted placenta	Yes	0	0.00%	0	0.00%	$\chi^2=0.00$ p=1.00 (NS)
	No	66	100.00%	66	100.00%	
Oligohydrominos	Yes	0	0.00%	0	0.00%	$\chi^2=0.00$ p=1.00 (NS)
	No	66	100.00%	66	100.00%	
Polyhydrominos	Yes	45	68.18	36	54.55%	$\chi^2=2.59$ p=0.11 (NS)
	No	21	31.82%	30	45.45%	
Family history of Diabetic Mellitus	Yes	38	73.08%	20	55.56%	$\chi^2=2.90$ p=0.08 (NS)
	No	14	26.92%	16	44.44%	
Drug used during pregnancy	Yes	21	31.81%	17	68.19%	$\chi^2=0.59$ p=0.0.44 (NS)
	No	45	68.18%	49	31.82%	

Table 3. Depicts that the distribution of study participants with the maternal outcomes of mothers in PCOS and non PCOS group. There was significant of PCOS with Labour duration and Mode of delivery with chi square value of $\chi^2=4.00$, $\chi^2=9.74$ 79 at p<0.05 level.

Table 3. Distribution of study participants with maternal outcomes of the mothers in PCOS and NON PCOS group.

Intranatal Outcomes		Non mothers		PCOS mothers		Chi square test
		N	%	N	%	
Fetal presentation	Vertex	62	93.94%	55	83.33%	$\chi^2=3.86$ p=0.15 (NS)
	Breech	2	3.03%	7	10.61%	
	Face	2	3.03%	4	6.06%	
Labour duration	Normal	58	87.88%	49	74.24%	$\chi^2=4.00$ p=0.05* (S)
	Prolonged	8	12.12%	17	25.76%	
Color of amniotic fluid	Clear	45	68.18%	36	54.55%	$\chi^2=2.59$ p=0.11 (NS)
	meconium stained	21	31.82%	30	45.45%	
Mode of delivery	Vaginal	52	78.79%	35	53.03%	$\chi^2=9.74$ p=0.01** (S)
	Caesarean section	14	21.21%	31	46.97%	
	Spontaneous	38	73.08%	20	55.56%	

		onset of labour					
If section	Caesarean	Induction of labour	14	26.92%	16	44.44%	
		Emergency c- section	9	64.29%	21	67.74%	$\chi^2=0.05$ $p=0.82$
		Elective c- section	5	35.71%	10	32.26%	(NS)
Prematurity	Yes		0	0.00%	1	1.54%	$\chi^2=1.02$
	No		66	100.00%	64	98.46%	$p=0.31$ (NS)

Table 4. State that the distribution of study participants according to neonatal outcomes in PCOS and NON PCOS group. There was statistical significant of NICU admission of neonates with PCOS mother includes chi square value of $\chi^2=9.09$ at $p<0.05$ level. Hence it indicates that compared with PCOS mothers were more chance to admit in NICU than non PCOS mother.

Table 4. Distribution of study participants according to the neonatal outcomes in PCOS and NON PCOS group

Neonatal outcomes		Non PCOS mothers		PCOS mothers		Chi square test
		n	%	n	%	
Birth weight	< 2.5.kg	2	3.03%	4	6.06%	$\chi^2=1.23$ $p=0.25$ (NS)
	2.5-3.0.kg	32	48.48%	27	40.91%	
	>3.0.kg	32	48.48%	35	53.03%	
Apgar	7.0	10	15.15%	24	36.36%	$\chi^2=8.40$ $p=0.05^*$ (S)
	8.0	40	60.61%	33	50.00%	
	9.0	16	24.24%	9	13.64%	
Admission to NICU	Yes	9	13.64%	24	36.36%	$\chi^2=9.09$ $p=0.01^{**}$ (S)
	No	57	86.36%	42	63.64%	
Neonatal death	Yes	0	0.00%	0	0.00%	$\chi^2=0.00$ $p=1.00$ (NS)
	No	66	100.00%	66	100.00%	
Neonatal icterus	Yes	0	0.00%	0	0.00%	$\chi^2=0.00$ $p=1.00$ (NS)
	No	66	100.00%	66	100.00%	
Congenital anomaly	Yes	1	1.52%	1	1.52%	$\chi^2=0.00$ $p=1.00$ (NS)
	No	65	98.48%	65	98.48%	

Table 5. Shows that the distribution of study participants according to the postnatal outcomes in PCOS and NON PCOS group. In non PCOS, majority of mothers 50 (54.35%) had <120mm of hg level of blood pressure, one (1.5%) had above umbilicus level of uterus involution, 59(55.1%) had normal postnatal bleeding. In PCOS, majority of mothers 42 (45.65%) had <120mm of hg level of blood pressure, one (1.5%) had above umbilicus level of uterus involution, 18(72.0%) had heavy postnatal bleeding.

Table 5. Distribution of study participants according to the postnatal outcomes in PCOS and non PCOS group

Postnatal Outcomes		Non PCOS Mothers		PCOS Mothers		Chi square test
		n	%	n	%	
Mother BP	<120	50	54.35%	42	45.65%	$\chi^2=3.20$ p=0.20 (NS)
	121-140	14	43.75%	18	56.25%	
	>140	2	25.00%	6	75.00%	
Uterus Involution	Above Umbilicus Level	1	1.52%	1	1.52%	$\chi^2=0.00$ p=1.00 (NS)
	At Umbilicus Level	65	98.48%	65	98.48%	
Postnatal Bleeding	Normal	59	55.14%	48	44.86%	$\chi^2=1.23$ p=0.27 (NS)
	Heavy	7	28.00%	18	72.00%	

DISCUSSION:

The antenatal outcomes had shown statistically significant association with Pregnancy induced hypertension, gestational diabetic mellitus and thyroid problem with chi square value of respectively ($\chi^2=8.89$ p=0.01), ($\chi^2=75.76$ p=0.001), ($S\chi^2=4.79$ p=0.05) at p<0.01 and p<0.05 level. Other variable like Placentaprevia, Abrupted placenta, Oligohydrominos, Polyhydrominos, Family history of Diabetic Mellitus had not shown statistically significant association with antenatal outcomes among postnatal mothers. **kjerulff E** to explore how maternal and neonatal complications are linked to PCOS in pregnant women. The meta analysis finds that PCOS in pregnancy is related with an expanded danger of gestational diabetes mellitus, pregnancy-induced hypertension, preeclampsia, preterm birth, caesarean delivery, operative vaginal delivery, SGA, and large-for-gestational age.¹¹ **foroozanfard M** which assesses the obstetric and neonatal outcomes in PCOS women with Gestational Diabetes Mellitus among 261 women using case control study design. The result shows that, women with PCOS and GDM are 2.4 times more risk for developing PIH than the women with GDM alone. It indicates women with PCOS and GDM are greater risk of developing preeclampsia and high blood pressure.¹²

The intranatal outcomes of mothers had shown statistically significant association with duration of labour and mode of delivery with chi square value of respectively ($\chi^2=4.00$ $p=0.05$) and ($\chi^2=9.74$ $p=0.01$) and other variables fetal presentation, color of amniotic fluid, and prematurity had not shown statistically significant association with maternal outcomes among postnatal mothers. The result of the study was supported by **kollmann M** which assesses the maternal and neonatal outcomes in pregnant women with PCOS among 885 women using Retrospective matched cohort study design. The result shows that, operative deliveries were more frequent in PCOS patients than in control. Women with PCOS had a higher odds ratio 1.7, 95% of class interval.¹⁰

The neonatal outcomes had shown statistically significant association with Apgar score and NICU admission of baby with chi square value of respectively ($\chi^2=8.40$ $p=0.05$), ($\chi^2=9.09$ $p=0.01$) at $p<0.05$ and $p<0.01$ level. Other variable like neonatal death, neonatal icterus, and congenital anomaly had not shown statistically significant association with neonatal outcomes among postnatal mothers. Hence the stated assumption is partially accepted. The result of the study was supported by **manoharan V** which assesses the impact of PCOS and Gestational Diabetes Mellitus on pregnancy outcomes among 326 women using retrospective cohort study design. The result showed that women with GDM and PCOS who delivered a neonatal had greater incidence of hypoglycemia ($p=0.40$) and NICU admission of Neonatal with hypoglycemia ($p=0.102$). Neonatal born to women with PCOS an Apgar score was less than 7 and statistically significant ($p=0.021$).¹³

The postnatal outcomes had not shown statistically association with blood pressure of postnatal mother, uterus involution and postnatal bleeding. Hence the stated assumption is not accepted. **liu S** which assesses the pregnancy outcomes of PCOS with in vitro fertilization treatment that result showed that, Women with PCOS were give birth prematurely (37 weeks) (26.5 percent vs. 21.9 percent; $P=0.039$). The risk of preterm birth (32 weeks) was also considerably greater in the PCOS group (3.9 percent vs. 1.6 percent; $P=0.002$). PIH were more commonly reported in the PCOS group (3.9 percent vs. 2.2 percent; $P=0.031$).⁵

CONCLUSION:

The women with PCOS are at increased risk of adverse maternal outcomes especially Pregnancy Induces Hypertension, Gestational Diabetic Mellitus, thyroid problem, extended labour duration, Caesarean section ,low Apgar score(<7) and NICU admission of neonatal. These women need additional periodic medical consultants during pregnancy and childbearing.

RECOMMENDATIONS

- A prospective study can be conducted to assess the maternal outcomes of PCOS and NON PCOS mother.

- The same study can be replicated on large sample to generalize the findings.
- Nursing curriculum should be updated to include comprehensive information about PCOS to improve the awareness of other women once in practice.
- A similar study can be conducted to assessing the knowledge and attitude regarding PCOS and adolescent girls.

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