



ORIGINAL RESEARCH PAPER

Obstetrics & Gynaecology

SOCIO DEMOGRAPHIC, PREVALENCE OF GESTATIONAL DIABETES MELLITUS AMONG ANTENATAL WOMEN AT A TERTIARY CARE HOSPITAL

KEY WORDS: Polycystic Ovarian Syndrome, Demographic, Gestational diabetes mellitus

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ABSTRACT

BACKGROUND: Gestational diabetes mellitus (GDM), defined as carbohydrate intolerance at onset of pregnancy (or first recognition), affects 4–7% of pregnancies overall. It is one of the common complications during pregnancy affecting both maternal and fetal outcome. The increased prevalence is due to the aging population structure, urbanization, obesity epidemic and physical inactivity. Other conditions predisposing to glucose intolerance might also increase the risk of GDM. Polycystic ovarian syndrome (PCOS) is the most common endocrine disorder among women of reproductive age groups. It is one of the leading causes of poor fertility. Risk factors include obesity, not enough physical exercise, and a family history. Most studies in India report prevalence of PCOS as 9.13% to 36%. The aim of the study was to explore the relationship between polycystic ovarian syndrome (PCOS) and subsequent gestational diabetes mellitus and its associated other risk factors and to assess the socio demographic parameter among antenatal women with and without PCOS.

METHODS: Hospital based analytical cross sectional study was conducted for 8 months among 198 antenatal women and followed up till 38 weeks of gestation. Fasting blood glucose was measured after which they were given 75 g oral glucose and plasma glucose was estimated at 2hour. GDM was diagnosed according to DIPSI criteria. Inclusion criterion was pregnant women aged 20-35 years attending outpatient department before 20 weeks of gestation. Exclusion criteria were known diabetic women, women suffering from chronic illnesses, twin pregnancy and women conceived after ART techniques.

RESULTS: About 9 % of normal pregnant women develop GDM and 19 % of PCOS pregnant women develop GDM. Prevalence of GDM was found to be 14.14% among pregnant women. Gestational diabetes mellitus was found to be associated with TSH and infertility complaints among pregnant women. There exists an association of family history of diabetes Mellitus, history of GDM in previous pregnancy, weight reduced, RMP with pain, PIH, Hypertension, Hirsutism, Acne, Polyhydraminos, acanthosis nigricans, insulin resistance, OI, preterm and infertility among PCOS and Normal pregnant women.

CONCLUSIONS: PCOS is becoming a more prevalent disorder among women of reproductive age with lifelong complications. The primary infertility was found among pregnant women and statistically significant. One of the most challenging aspects of this syndrome is its ambiguous diagnostic criteria and vast complexity of characteristics.

INTRODUCTION:

Polycystic ovary syndrome (PCOS) is the most common endocrine disorder in women of reproductive age, with a reported prevalence between 6% and 15%^{1,2}. The disease is characterized by ovulation disorders, androgen excess, and polycystic ovarian morphology². Moreover, PCOS is a primary risk factor for adverse pregnancy outcomes^{3,4}. A meta-analysis conducted by Kjerulf et al⁵ indicated that pregnancy in PCOS patients was associated with increased risk of gestational diabetes mellitus (GDM), pregnancy induced hypertension (PIH), preeclampsia, preterm delivery, and small-for-gestational-age (SGA); however, there was no significant impact on the risk of cesarean delivery, operative vaginal delivery, and large-for-gestational age (LGA). However, data on the impact of PCOS in pregnancy on subsequent fetal and neonatal outcomes are both limited and inconclusive. A meta-analysis by Qin et al⁶ showed that PCOS in pregnancy led to increased risk of GDM, PIH, preeclampsia, preterm delivery, and cesarean delivery had negative effects on birth weight, and increased the risk of admission to the NICU. Toulis et al⁷ evaluated the association between PCOS in pregnancy and the risk of GDM, and reported similar outcomes. Research has shown that individuals with lower SES are more at risk among women, obesity is associated with low SES^{8,9}. Studies have also shown that smoking and obesity can exacerbate insulin resistance¹⁰, which is a condition highly correlated with and part of the pathogenesis of PCOS¹⁰. The aim of the study was to explore the relationship between polycystic ovarian syndrome (PCOS) and subsequent gestational diabetes mellitus and its associated other risk factors and to assess the socio economic parameter among PCOS and without PCOS antenatal women.

METHODS:

A hospital based analytical Cross sectional study was conducted from 198 pregnant patients attending Antenatal OPD and admitted in labour ward with PCOS who satisfy the eligibility

criteria were included till the sample size was reached and compared to equal number of healthy pregnant women without PCOS before 20 weeks of gestation for the period of eight months from January 2017 to August 2017 and followed up till 38 weeks of gestation. Informed consent was obtained from all the participants at the start of the study. Ethical clearance was taken from the institutional ethical committee before starting the study.

Inclusion criteria: Study group:

Pregnant women with PCOS aged 20-35 yrs registered /admitted before 20 weeks of gestation and Healthy Pregnant women aged 20-35 yrs registered /admitted before 20 weeks of gestation.

Exclusion criteria:

1. Known diabetic women.
2. Women suffering from chronic illnesses
3. Twin pregnancy.
4. Women conceived after ART techniques.

METHOD OF THE STUDY:

All pregnant patients attending Antenatal OPD and admitted in labour ward with PCOS who satisfy the eligibility criteria were included till the sample size was reached and compared to equal number of healthy pregnant women without PCOS before 20 weeks of gestation and followed up till 38 weeks of gestation. After getting consent from the patient 75 grams of glucose mixed with 300 ml of water was given to the patient and two of venous blood would be withdrawn after a period of two hours for blood sugar irrespective of the last meal or fasting status. A detailed history regarding the symptoms of PCOS, when and how they got diagnosed was obtained. The General examination including features of hyper androgenism, insulin resistance was elicited. The History regarding infertility, previous history of GDM, anomalous baby, recurrent abortion and history of LGA babies was obtained

and also Obstetrics examination was performed. The Diabetology opinion was obtained for the diagnosed cases and they were treated according to their advice.

RESULTS:

Statistical methods:

Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables. Data was also represented using appropriate diagrams like bar diagram and pie diagram. The association between explanatory variables and categorical outcomes was assessed by cross tabulation and comparison of percentages. Chi square test was used to test statistical significance. P value < 0.05 was considered statistically significant.

Table 1: Demographic parameter of study population (N=198)

Age group	Group		χ^2	P-value
	Normal	PCOS		
Up to 24	48 (48.48%)	39 (39.39%)	1.661	0.435831
25 - 29	40 (40.4%)	47 (47.47%)		
30 and above	11 (11.11%)	13 (13.13%)		

The table 1 shows that age group wise pregnant women with PCOS and normal. Out of 198 study population about 11.1% of women belong to more than 30 years of age with normal and it was 13.1% in PCOS women. There was no association between age and group of study population and not statistically significant.

Table 2: Educational level of pregnant women in Study population

Education	Normal	PCOS	Total	χ^2	P value
illiterate	12 (12.1%)	13 (13.1%)	25(12.6%)	0.0457803	0.83072
Literate	87 (87.9%)	86 (86.9%)	153(87.4%)		

The above table 2 shows the educational status of the pregnant women among normal and PCOS groups. Out of 198 study population 12.6 % of the pregnant populations had no education and 87.4 % of them had literate. There was no association between education and study group and not statistically significant.

Table 3: Socio economics status of the study population

SES	Normal	PCOS	Total	χ^2	P value
3rd class	8 (8.08%)	10 (10.1%)	18(9.1%)	3.166	0.205
4th class	81 (81.82%)	71 (71.72%)	152(76.8%)		
5th class	10 (10.1%)	18 (18.18%)	28(14.1%)		

The table 3 reveals that most of our study population belongs to socioeconomic class 4.

Table 7: Other associated risk factors with study population

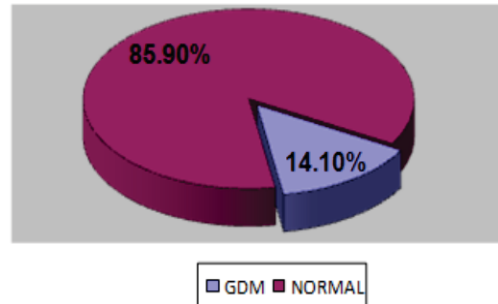
Variable	GROUP		χ^2	p-value	Variable	GROUP		χ^2	p-value
	NORMAL (N=99)	PCOS (N=99)				NORMAL (N=99)	PCOS (N=99)		
PIH			3.56	0.59	Hypertension			1.874	0.171
Yes	6 (6.1%)	14 (14.1%)			Yes	12 (12.1%)	19 (19.2%)		
No	93 (93.9%)	85 (85.9%)			No	87 (87.9%)	80 (80.8%)		
RMP			114.4	<0.001	OI				
Yes	91 (91.9%)	16 (16.2%)							
No	8 (8.1%)	83 (83.8%)							

Table 4: Association of Group with GDM of study population (N=198)

GDM	Group		χ^2	P-value
	Normal	PCOS		
Positive	9 (9.09%)	19 (19.19%)	4.160	0.041
Negative	90 (90.91%)	80 (80.81%)		

The table 4 shows the relation between GDM positive women among the study population. It reveals that 9 % of normal pregnant women develop GDM and 19 % of PCOS pregnant women develop GDM. There exists an association between GDM and Groups that Normal and PCOS and statistically significant.

Fig 1: Prevalence of GDM in study population



The above pie diagram shows that the prevalence of GDM among pregnant women. It revealed that 14.1% was the prevalence rate in the study population.

Table 5: TSH and GDM among study population

TSH	GDM			Chi-Square
	positive	negative	Total	
increased	7	8	15	14.140675
Normal	21	162	183	

p-value 0.00017

The table 5 shows the other risk factor that hypothyroidism which in turn associated with GDM of the study population. We found that there exists a relation between GDM and TSH in pregnancy women of the study population and it statistically significant.

Table 6 GDM and among study population

Infertility Complaint	GDM		Total	$\chi^2 = 7.9$ p value is 0.004913
	positive	negative		
Yes	16	51	67	
No	12	119	131	

The table 6 reveals that there exists an association between GDM and infertility among the study population and statistically significant.

With Pain			138.2	<0.001	Yes	1 (1.01%)	44 (44.4%)	53.174	<0.001
Yes	97 (98.0%)	15 (15.2%)			No	98 (98.99%)	55 (55.6%)		
No	2 (2.0%)	84 (84.8%)			No	99 (100%)	62 (62.6%)		
Acne			59.15	<0.001	Preterm				
Yes	4 (4.0%)	53 (53.5%)			Yes	4 (4.04%)	6 (6.1%)	0.421	0.516
No	95 (96.0%)	46 (46.5%)			No	95 (95.96%)	93 (93.9%)		
Hirsutism			76.5	<0.001	Poly hydraminos				
Yes	1 (1.01%)	57 (57.6%)			Yes	7 (7.1%)	23 (23.2%)	10.05 7	0.002
No	98 (98.99%)	42 (42.4%)			No	91	76		
H/O GDM			1.333	0.248	Infertility				
Yes	2 (2.02%)	5 (5.05%)			Yes	7 (7.1%)	59 (59.6%)	61.455	<0.001
No	97 (98.0%)	94 (95.0%)			No	92 (92.9%)	40 (40.4%)		
Insulin			0.649	0.42	Acan nigr				
Yes	5 (5.1%)	9 (9.1%)			Yes	5 (5.1%)	41 (41.4%)	36.7	<0.001
No	94 (94.9%)	90 (90.9%)			No	94 (94.9%)	58 (58.6%)		
Diabetes Mellitus			11.65	<0.001	Weight reduced				
Yes	15 (15.2%)	36 (36.4%)			Yes	2 (2.0%)	26 (26.3%)	23.96	<0.001
No	84 (84.8%)	63 (63.6%)			No	97 (98.0%)	73 (73.7%)		

The table 7 reveals the other associated risk factors among pregnant women with PCOS and without PCOS. The pregnancy induced hypertension, menstrual cycles with pain, Acne, Hirsutism, Hypertension, OI, Preterm, Poly hydraminos, Infertility, acanthosis nigricans, insulin resistance, Weight reduced and Diabetes Mellitus are the other risk factors prevailing in the study groups other than gestational diabetes mellitus.

DISCUSSION:

In present study out 198 women, GDM was diagnosed in 28 which contribute to 14.1%. Seshiah et al found very high prevalence of 17.7% in Indian population¹¹. Similarly in Gracelyn LJ et al study, 11.8% of pregnant women had GDM¹². According to Gracelyn LJ et al study 62.7% of GDM women were above 25 years of age¹². In our study we noticed 60.7% women with GDM were >25 years. According to Sharma et al, BMI >30 was observed in 30 (64%) GDM Women¹³. Similarly in our study, 57.1% (16/28) of GDM women were obese. Pregnant women with positive family history of diabetes had higher chances of getting GDM¹⁴. Similar to our study, Seshiah et al also observed a strong correlation between the family histories of diabetes with the development of GDM in pregnancy¹⁴. In our study 67.9% of GDM women had positive family history of diabetes which was 52.5% in Gracelyn LJ et al study¹² and 76% in Soheilykhah et al study¹⁵. Raja SA et al in their study found that the prevalence of PCOS was 30% of the study population of Acne and the 93.3% were reported as Hirsutism among the PCOS¹⁶. In the present study, Acne was 53.5% of the pregnant women with PCOS and hirsutism was found 57.6% in pregnant women with PCOS. Amita Gupta et al found age

structure wise prevalence of PCOS in their study that 26.7% were in up to 24 years, 24.8% were in (25-29) age group and the remaining 21.3% were in >30years¹⁷. In present study, we found that 39.4% were in up to 24 years, 47.5% were in (25-29) age group and 13.1% were in >30 years. Geeti P Arora et al stated in their study that 33% were illiterate and 67% were literate¹⁸. In present study the illiterate was only 12.6% and 87.4% were literate women. The difference in literacy status was due the study settings.

CONCLUSIONS:

We had confirmed that pregnant women with a history of PCOS had more than two-fold increased probability of GDM compared with women without PCOS. We found that there exists an association between GDM and antenatal women presenting with infertility in the study population. We found that there exists a relation between GDM and TSH in antenatal women and statistically significant. We suggest that behavior and life style modification are important part of treatment for PCOS.

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