

Frequency of gestational diabetes mellitus and associated risk factors

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Objective: To determine frequency of gestational diabetes and its associated risk factors among pregnant women.

Methodology: This descriptive cross sectional study was conducted in Department of Obstetrics & Gynecology, Pakistan Institute of Medical Sciences, Islamabad, Pakistan from April 2017-September 2017. A total of 380 patients were recruited using simple random sampling. Patients underwent detailed history and oral glucose tolerance test (OGTT) using American Diabetes Association guidelines. OGTT was considered normal with blood sugar fasting (BSF) <95mg/dl, after 1 hour <180mg/dl, after 2 hour <155mg/dl and after 3 hours <140mg/dl. SPSS version 22.0 was used for data analysis.

Results: Out of 380 patients, 270(71%) were in age group 22-32 years while 110(29%) were in 33-45 years age group. Mean gestational age was 29.9±8.7 weeks. Frequency of gestational diabetes mellitus was 24%. A significant association between GDM and age ($p=0.01$), education ($p=0.03$), Parity ($p=0.00$), time interval between pregnancies ($p=0.01$) and gravidity ($p=0.00$) was found.

Conclusion: High frequency of gestation diabetes mellitus was found. It was strongly associated age, educational level, parity, gravidity and time interval between pregnancies. (Rawal Med J 201;43:459-461).

Key words: Gestational diabetes mellitus, parity, gravidity.

INTRODUCTION

Glucose intolerance during pregnancy is known as gestational diabetes mellitus (GDM).¹ Prevalence is reported as 1-14%, globally.² It is responsible for complications in 7% of all pregnancies annually, worldwide.³ Prevalence of GDM in Pakistan is 3.45%.⁴ GDM is result of insulin resistance with lower beta cell compensation during pregnancy.⁵ However, diabetogenic effect of pregnancy has significant contribution in its development.⁶ Human placental lactogenic hormone secretion in second and third trimester of pregnancy leads to high glucose level resulting in insulin desensitization.^{7,8} Insulin resistance during pregnancy is also affected by progesterone, growth hormone, estrogen and cortisone hormones.^{9,10}

Gestational diabetes leads to maternal complications including urinary tract and vaginal infections, preeclampsia, shoulder dystocias, perineal tears, post partum bleeding and inductions of labor.^{11,12} Obesity, lack of physical activity, interval between pregnancies <24 months, insulin

therapy and age are associated risk factors of GDM.¹³ A study reported that short stature is also associated with GDM.¹⁴ Ali et al reported that history of diabetes and poly cystic ovary syndrome is not associated with GDM.¹⁵ Limited data is available on GDM in Pakistan. Present study aims to determine its frequency and associated risk factors among pregnant women.

METHODOLOGY

This descriptive cross sectional study was conducted in Department of Obstetrics & Gynecology, Pakistan Institute of Medical Sciences, Islamabad from April 2017 to September 2017. Sample size of 380 patients was calculated using Open Epi Software and Simple random sampling was used. An inclusion criterion of participants was based upon age 22-45 years, non diabetic and women with gestational age 16-36 weeks. Patients with cardiovascular disorders, bone fractures, nerve palsy, jaundice, shoulder dystocia, renal disorders were excluded. Ethical approval and Informed

consent were taken.

Patients underwent detailed history and oral glucose tolerance test (OGTT) using American Diabetes Association guidelines. OGTT was considered normal with blood sugar fasting (BSF) <95mg/dl, after 1 hour <180mg/dl, after 2 hour <155mg/dl and after 3 hours <140mg/dl. Patients with difference in any two values were diagnosed with GDM. Data was analyzed using SPSS version 22.0. Chi-square test was applied for measuring association.

RESULTS

Out of 380 participants, 270(71%) were in age group 22-32 years while 110(29%) patients in 33-45 years age group. Mean gestational age was 29.9±8.7 weeks. Out of 380 participants 90(24%) had GDM.

Table. Association between gestational diabetes and risk factors.

Risk Factors	Gestational diabetes Mellitus		Total	Chi-square value	P value
	Yes	No			
Age					
22-32 years	30(11%)	240(89%)	270(71%)	18.973	0.01
33-45 years	60(55%)	50(45%)	110(29)		
Education					
Metric	40(22%)	140(78%)	180(47%)	23.632	0.03
Intermediate	30(33%)	60(67%)	90(24%)		
Bachelors	10(14%)	60(86%)	70(18%)		
≥Masters	10(25%)	30(75%)	40(11%)		
Parity					
1	30(10%)	280(90%)	310(82%)	32.435	0.00
>1	60(86%)	10(14%)	70(18%)		
Gravidity					
≤2	20(20%)	80(80%)	100(26%)	34.899	0.00
>2	70(23%)	230(77%)	300(74%)		
Family History of DM					
Yes	50(42%)	70(58%)	120(32%)	13.090	0.06
No	40(15%)	220(85%)	260(68%)		
Time interval between pregnancies					
<24 months	75(33%)	155(67%)	230(61%)	20.667	0.01
≥24 months	15(10%)	135(90%)	150(39%)		
Total	90(24%)	290(76%)	380(100%)		

Among all the patients who were in age group 22-23 years, 270(71%), 30(11%) had GDM while 240(89%) did not have GDM. Similarly, among all

those who were in 33-45 years age group 110(29%), 60(55%) had GDM while 50(45%) did not have GDM ($\chi^2 = 18.973, p=0.01, df=1$). Risk factors in regard to age, education, parity, gravidity, family history and time interval between pregnancies is shown in the Table. An insignificant association with obesity and PCOS was found ($p>0.05$).

DISCUSSION

Gestational Diabetes mellitus is major complication associated with maternal and fetal health outcome. Frequency of GDM in our study was 24%. Ali et al reported that prevalence of GDM in Indians was 11.8%.¹⁵ Other studies reported the prevalence of 8.3%,¹⁶ and 6.9%.¹⁷

In our study, significant association between age and GDM was found ($\chi^2=18.973, p=0.01, df=1$). Schoenaker & Mishra reported that women who had menstrual cycle beginning at the age of less than 11 years, were more likely to develop GDM.¹⁸ Tettamanti et al reported that women above 25 years were more prone to develop GDM.¹⁹ We found that among all those who had intermediate level of education 33% had GDM while 67% did not. A significant association was found between level of education and GDM ($\chi^2=23.632, p=0.03, df=1$). Rajeesh et al reported that frequency of GDM increased with educational level of patients, as GDM was found to be highest among graduates (14.3%).²⁰ However, Amiri et al found that there was no association between prevalence of GDM and education qualification of patients.²¹

We found that among all those who had parity equal to 1, 10% had GDM and 90% did not. Significant association was found between parity and GDM ($\chi^2=32.435, p=0.00, df=1$). Kahn et al reported that higher birth rate among African women with high rate of multiparity leads to insulin resistance and at high risk of developing GDM.²²

In our study, among all those who had 2 gravidity 20% had GDM while 80% did not. Significant association was found between gravidity and GDM ($\chi^2=34.899, p=0.00, df=1$). Seabra et al reported that gravidity was strongly associated with GDM ($p<0.05$).²³

To the best of our knowledge, this is first report

showing frequency of GDM and associated risk factors in our institution. Limitation of study are that it was conducted at single center that limits its generalizability.

CONCLUSION

High frequency of gestation diabetes mellitus (24%) was found. GDM is strongly associated age, educational level, parity, gravidity and time interval between pregnancies.

Author Contributions:

Conception and design: Natasha Khan
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 Critical revision of the article for important intellectual content: Afshan Batool
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