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The frequency of gestational diabetes mellitus & its responsible factors among pregnant women presenting at a tertiary care hospital, Karachi

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Abstract---Controlling the related factors implicated in the development of GDM may help to mitigate the sharp rise in the prevalence of GDM and its detrimental effects on maternal and newborn problems. Maternal age (over 30 years), prior history of gestational diabetes, increased BMI, family history of diabetes, parity, belonging to an ethnic group with a high correlation with GDM and prior birth of a large baby are the key related factors of GDM. Aim: The main goal is to determine the frequency of gestational diabetes mellitus among pregnant women and its causing factors. Place and Duration: This Descriptive, cross-sectional study was held in Department of Gynecology, Liaquat National Hospital, Karachi from 16th January 2017 to 15th July 2017. Methods: 250 pregnant women with gestational diabetes mellitus between the 18-45 years of age were included. Multiple gestations, unbooked cases, and cases of known DM were not included. Development of gestational diabetes is the primary outcome factor which was determined. Maternal age, parity,

gestational age, grand multiparity, BMI (for obesity), prior GDM, prior experience of macrosomic infant, family history of DM & PCOS are additional study variables (responsible factors). Results: In this analysis, 70 (28.0%) pregnant females have gestational diabetes mellitus. Age >35 years (32.80%), grand multiparity (47.60%), obesity (53.60%), prior gestational diabetes mellitus (68.40%), prior history of macrosomic infant (44.80%), and polycystic ovarian syndrome (49.20%) are the contributing variables in females. Conclusion: This study indicated that 28.0% of pregnant females had gestational diabetes mellitus.

Keywords---obesity, multiparity, and gestational diabetes mellitus.

Introduction

Pregnant females with diabetes may have type I or II diabetes that was diagnosed before to becoming pregnant or gestational diabetes mellitus, which is when hyperglycemia is first noticed during pregnancy (GDM)¹⁻². Poor glycemic control during the time of foetal organogenesis, which is almost finished by the twelve-week post conception, increases the risk of spontaneous abortion and congenital defects in the child. With an increase in glycosylated haemoglobin, the risk multiplies dramatically³. On the other hand, HbA1c in the early pregnancy is within normal range, the rates of malformation are comparable to the background population at about two percent⁴. The gestational diabetes mellitus (GDM) defined as intolerance to glucose that first noticed during pregnancy or manifests itself. GDM may have harmful effects on both the mother and the children. It affects 3–10% of pregnancies and is classically a transient ailment that only happens during pregnancy, but in some situations, it may persist permanently as Diabetes Mellitus⁵⁻⁶. Both the children and mother are at an increased danger of acquiring diabetes. Preeclampsia, intrauterine growth restriction, congenital malformations, elevated rates of Caesarean sections, and macrosomia are further consequences. Up to 14% of all pregnancies in the US and 6% of pregnancies in Europe are impacted by GDM⁷⁻⁸. Controlling the related factors implicated in the development of GDM may help to lessen the prevalence of GDM and its detrimental effects on maternal and newborns. Maternal age (over 30 years), increased BMI, parity, family history of diabetes, ethnic group with a strong correlation for GDM, prior history of gestational diabetes, and a previous birth of a large baby are the key related factors of GDM (greater than 4.5 kg). In a study, Saeeda Bibi and colleagues discovered that 26.3% of patients had been diagnosed with GDM⁹. The study identified several risk factors that were significantly linked to the development of GDM, including patient age >35 years (45.12%), obesity (44.68%), polycystic ovarian syndrome (46%), prior history of GDM (78.57%), prior history of macrosomic baby (60%) and prior family history of diabetes (53.96%). According to another study, 84.5% of GDM females had a positive diabetes mellitus family history and 75.5% had previously experienced GDM. Furthermore, 35.9% were multiparous, 9.8% of females were primiparous and grand multiparous accounts for 54.4%. In terms of employment, it was discovered that 24.3% of women were employed and 75.7% were housewives¹⁰⁻¹¹. According to a study, GDM occurred in 7.2% of pregnant women. In contrast, a different study found that 20.4% of

pregnant women had gestational diabetes. This demonstrates a significant disparity in the severity of the burden of GDM across pregnant women¹². A small number of studies have been done that also reveal a significant amount of evidence in our community. This provides a good justification for this study¹³. The findings of this study will aid in developing strategies, increasing awareness, and changing dietary and lifestyle attitudes in order to avoid the onset of GDM and reduce maternal and foetal morbidity and mortality.

Methods

This Descriptive, cross-sectional study was held in Department of Gynecology, Liaquat National Hospital, Karachi from 16th January 2017 to 15th July 2017. A non-probability, consecutive sampling strategy was used to choose 250 gestational diabetes mellitus-afflicted women between the ages of 18 and 45.

Inclusion Criteria

1. Gestational age between 24 and 40 weeks on history and ultrasound
2. 18-45 years of age.
3. Primary, multiple, or grand multigravida
4. Singleton pregnancy (found on ultrasound).
5. The woman's readiness to take part in the research.

Exclusion criteria

1. Unbooked cases
2. Known diabetic mellitus cases (having history of taking oral hypoglycemic drugs or insulin)
3. Twin pregnancy and multiple gestations (found on U/S).

Data collection was initiated after receiving approval for the summary from the Research Evaluation Unit of the CPSP, Karachi, and then authorization from the IRB of Liaquat National Hospital. After receiving appropriate written consent, pregnant patients who are eligible and present for a prenatal appointment at the obstetrical OPD were enrolled. The researcher herself undertook a complete history taking, general physical examination, and pelvic examination under the supervision of the supervisor. The patient's name, husband's name, address, contact information, occupation, gestational age, parity, prior obstetrical history (previous GDM, prior history of macrosomic baby), patient's height and weight and diabetes mellitus family history were all recorded. To confirm the gestational age and BSR levels, a fasting blood sugar (FBS) and ultrasound were performed. The polycystic ovarian syndrome was also evaluated in the ultrasound report. Development of gestational diabetes is the primary outcome factor which was determined. Maternal age, parity, gestational age, grand multiparity, BMI (for obesity), prior GDM, prior experience of macrosomic infant, family history of DM & PCOS are additional study variables (responsible factors). The researcher herself collected the information using the prescribed proforma. All individuals who developed GDM had treatment in accordance with the institution's protocol. SPSS version 19 was used to enter and analyse all data. Maternal age, gestational age, parity, FBS level, and BMI were all continuous variables that were calculated

as standard deviation (Mean SD) and mean. Gestational age was stratified followed by the chi-square test with a p value 0.05 taken as significant in order to assess the effect modification of the primary outcome, i.e. GDM, and the contributing factor (gestational diabetes mellitus). The College of Physicians & Surgeons of Pakistan's Research Evaluation Unit was contacted to request approval for the study. The institution's IRB (LNH), Karachi, gave its approval for the data gathering. All patients who were participating were asked for their informed and written consent. The responders received guarantees that the information they gave would be kept private.

Results

This study's sample population were 18 to 45 years of age with 32.32 ± 4.70 years of mean age. According to Table I, the majority of the 168 patients (67.20%) were between the ages of 18 and 35.

Table-I: Age distribution of patients (n=250)

Age (in years)	No. of Patients	%age
18-35	168	67.20
36-45	82	32.80
Total	250	100.0
Mean $\pm$ SD	32.32 ± 4.70 years	

The mean gestation period was 28.74 ± 3.77 weeks (Table II). The mean parity was 4.39 ± 1.82 . The average BMI was $28.21 \text{ kg/m}^2 \pm 3.05$. FBS levels were $101.24 \pm 7.23 \text{ mg/dl}$ on average.

Table-II: Distribution of patients according to gestational age (n=250)

Gestational age (weeks)	No. of Patients	%age
20-30	132	52.80
31-40	118	47.20
Total	250	100.0
Mean $\pm$ SD	Mean $\pm$ SD = 28.74 ± 3.77 weeks	

In this study, there were 70 (28.0%) pregnant women who had gestational diabetes mellitus (Figure I).

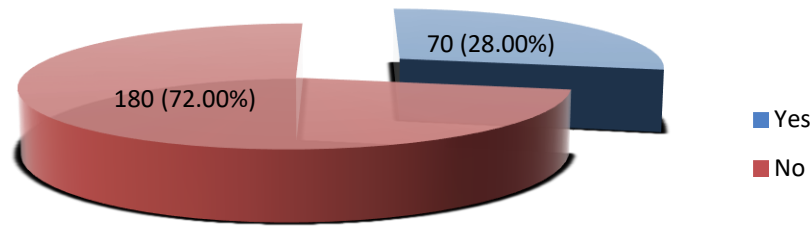


Figure I: Frequency of gestational diabetes mellitus among pregnant women (n=250)

Age >35 years (32.80%), grand multiparity (47.60%), obesity (53.60%), prior gestational diabetes mellitus history (68.40%), prior history of macrosomic baby (44.80%), family history of diabetes mellitus (31.60%) and polycystic ovarian syndrome (49.20%) are the factors that contribute to females developing diabetes mellitus.

Table III: Frequency of responsible factors for GDM

Factors	Frequency (%)	
	Yes	No
Age >35 years	82 (32.80%)	168 (67.20%)
Grand multiparity	119 (47.60%)	131 (52.40%)
Obesity	134 (53.60%)	116 (46.40%)
Previous GDM	171 (68.40%)	79 (31.60%)
Family history of DM	79 (31.60%)	171 (68.40%)
Previous history of macrosomic baby	112 (44.80%)	138 (55.20%)
Polycystic ovarian syndrome	123 (49.20%)	127 (50.80%)

Table IV displays the stratification of gestational diabetes mellitus according to gestational age. Table VII displays a stratification of the causative factors according to gestational age.

Table IV: Stratification of gestational diabetes mellitus with respect to gestational age

GA (weeks)	Gestational diabetes mellitus		p-value
	Yes	No	
20-30	53	79	0.0001
31-40	17	111	

Table V: Stratification of responsible factors with respect to gestational age

Factors		20-30 weeks (n=132)	31-40 weeks (n=118)	P-value
Age >35 years	Yes	38	44	0.153
	No	94	74	
Grand multiparity	Yes	71	48	0.038
	No	61	70	
Obesity	Yes	66	68	0.227
	No	66	50	
Previous GDM	Yes	79	92	0.002
	No	53	26	
Family history of DM	Yes	57	37	0.054
	No	75	81	
Previous history of macrosomic baby	Yes	49	63	0.010
	No	83	55	
Polycystic ovarian syndrome	Yes	62	61	0.456
	No	70	57	

Discussion

Pregnant women are susceptible to gestational diabetes mellitus (GDM), a non-infectious condition. The global median forecast for GDM is between 6% and 13%. According to recent estimates, up to 9% of all pregnancies in the United States were complicated by GDM. 109 The total current prevalence of GDM in Central and South America is estimated at 11%¹⁴⁻¹⁵. There is strong evidence that women with GDM have a higher risk of pre-eclampsia, preterm delivery, a higher likelihood of cesarean section and type 2 diabetes in the future¹⁶. Gestational diabetes is also associated with an increased risk of prenatal problems such as anomalies, shoulder dystocia, neonatal hypoglycemia, and perinatal mortality. Previous studies have repeatedly identified obesity and a family history of diabetes as the two major risk factors for GDM. Advanced maternal age, non-Caucasian race, previously undiagnosed stillbirth, and obesity are additional risk factors for GDM¹⁷⁻¹⁸. This research was done to find out how common gestational diabetes mellitus is among pregnant women and what causes it. In my study, there were 70 (28.0%) pregnant women who had gestational diabetes mellitus. Age >35 years (32.80%), grand multiparity (47.60%), obesity (53.60%), prior gestational diabetes mellitus (68.40%), prior history of macrosomic infant (44.80%), and polycystic ovarian syndrome (49.20%) are the contributing variables in females. According to a study, GDM occurred in 7.2% of pregnant women¹⁹. In contrast, a different study found that 20.4% of pregnant women had gestational diabetes. In a study,

Saeeda Bibi and colleagues discovered that 26.3% of patients had been diagnosed with GDM. The study identified several risk factors that were significantly linked to the development of GDM, including patient age >35 years (45.12%), obesity (44.68%), polycystic ovarian syndrome (46%), prior history of GDM (78.57%), prior history of macrosomic baby (60%) and prior family history of diabetes (53.96%)²⁰. According to another study, 84.5% of females with GDM had a positive diabetes mellitus family history and 75.5% had previously experienced GDM. Furthermore, 9.7% of women were primiparous, 54.4% were grand multiparous and 35.9% were multiparous. In terms of employment, it was discovered that 24.3% of women were employed and 75.7% were housewives.

In research, about 16% of expecting mothers had GDM diagnosed. Obesity and depression each had a prevalence of 24.4% and 10.6%, respectively²¹. Mid-pregnancy obesity was linked to a 1.62-fold augmented risk of GDM (95% CI: 1.04-2.59, OR: 1.64) after controlling for covariates. Individuals with a diabetes mellitus family history had a 1.6-fold high chance of getting GDM than females without GDM (OR: 1.51, 95% CI: 1.10-2.07). Depression was linked to 1.52 times the probability of developing GDM (OR: 1.56; 95% CI: 1.10-2.20). According to a study by Saleh NM, Al-Hamaq A and Bener A (2011), 16.3% of women in Qatar had GDM, and the prevalence was substantially greater in women between the ages of 35 and 45. The primary significant risk variables for GDM in their study were advanced maternal age, poor monthly income, obesity and diabetes mellitus family history.²²⁻²³

In India, the GDM prevalence was determined to be 2% in research conducted in 1982 and 7.62% in a subsequent investigation. According to reports, the GDM rate among rural women in the Jammu district was 6.7%. 126 According to a random survey conducted in 2002-2003 in several Indian towns, the prevalence of GDM was 15% in Thiruvananthapuram, 16.2% in Chennai, 12.1% in Bangalore, 21.1% in Alwaye, 17.5% in Ludhiana and 18.8% in Erode²⁴.

In our study, it was found that women with higher BMIs and pre-pregnancy weights had significantly greater rates of GDM. In earlier investigations, it was also found that women with higher BMI had a higher prevalence of GDM. By the end of the second trimester, weight gain during pregnancy should be around 6 kg. Weight increase was considerably higher in GDM women in comparison to normal blood glucose levels, according to Saldana et al²⁵. According to Bo et al., pregnancy hyperglycemia was a risk factor for excessive gestational weight gain. According to Seshiah et al., GDM in pregnant women is significantly more common when there is a family history of diabetes mellitus²⁶. It was observed that there was a strong correlation between prior GDM history and the development of GDM during the index pregnancy. Women having a history of GDM had an odds ratio of 23, according to McGuire et al²⁷.

Conclusion

This study concluded that 28.0% of pregnant women had gestational diabetes mellitus. Age >35 years (32.80%), grand multiparity (47.60%), obesity (53.60%), prior gestational diabetes mellitus (68.40%), prior history of macrosomic infant (44.80%), and polycystic ovarian syndrome (49.20%) are the contributing factors

in females. Thus, we advise that education campaigns be organized to encourage dietary and lifestyle changes among the general public in order to reduce maternal and foetal morbidity and mortality caused by GDM.

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