

Clinical profile and associated risk factors of gestational diabetes mellitus in a tertiary hospital

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Abstract

Background: Gestational diabetes is a condition that attracts notice and concern among physicians and gynaecologists alike. It leads to various complications like still birth, preeclampsia still birth, preeclampsia pregnancy induced hypertension, abortion, and difficult labour,(10-16). Gestational diabetes mellitus (GDM) has been observed to be associated with increased perinatal morbidity and mortality. It is becoming a public health concern globally as well as in India with fast increasing trend. It affects approximately 14% of all pregnancies. **Objective:** To study the maternal risk factors for developing GDM in women based on personal and family histories. **Material and Methods:** A hospital based case control study was conducted in Kamineni Hospital, LB Nagar, Hyderabad with a sample size of 200(100 cases and 100 controls) during 2018. Pregnant women with gestational diabetes mellitus as diagnosed by abnormal oral Glucose Tolerance Test (OGTT) were taken as cases and pregnant women who have completed 24 weeks of gestation and who tested negative on Glucose Challenge test (GCT) were selected as controls. **Results:** 1.Progressing age is a predisposing factor for development of GDM, as in age group above 30 years 26% in cases had GDM and only 12% in control group were having GDM. In age group above 30 years only 25% had GDM when compared to age group <25 years compared to controls 2.GDM affects upper(35%) and middle class(22%)more compared to women from low socioeconomic status (12%) 3.High BMI between 25 - 30 is consistently associated with higher incidence of GDM **Conclusion:** Modifiable risk factor like BMI deserve attention for prevention of GDM and associated factors like progressing age, parity, family history of diabetes mellitus and hypertension are area of concern for treating doctors.

Key Words: gestational diabetes mellitus.

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INTRODUCTION

Nearly six million births in India get affected by diabetes and prediabetes. 90% amongst them are due to GDM. Gestational diabetes mellitus (GDM), which is defined as the onset or recognition of glucose intolerance during pregnancy,^{10,11} is also becoming a public health concern globally. only half of them get tested post partum as there is lack of adequate consensus among treating doctors regarding oral glucose tolerance test despite available

guidelines. Uncontrolled GDM may land up even with overt diabetes in mothers few years after delivery. It is associated with increased incidence of hypertensive disease and caesarian section in pregnancy. The presence of fasting hyperglycemia (fasting plasma glucose>106 mg/dl) is associated with increased intrauterine death in last 4 to 8 weeks of gestation. Also, effective communication among physicians, patients, and primary care providers is essential for GDM management, as patient compliance and proper educational interventions promote better pregnancy outcomes The cornerstone for the management of GDM is glycemic control and quality nutritional intake. However, GDM patients who fail to control their glucose levels through lifestyle modifications may require insulin. The national list of essential medicines in India includes insulin, which is considered as the gold standard for glycemic control during pregnancy⁴ In kamineni hospital, lb nagar the test for GDM i.e. OGCT (oral glucose challenge test)is done at 24-28 weeks of gestation in individuals having risk

factors for GDM. In individuals where suspicion exists test may be repeated at 32 weeks.

OGCT (oral glucose challenge test): 50gm. glucose taken orally at random and sample is collected after one hour. GDM is suspected where sample >140mg/dl. Subsequently confirmatory test is

OGTT (oral glucose tolerance): Is done wherein, 75gm. sugar is given orally after overnight fasting and three samples are collected in fasting state, at first hour and at second hour. GDM is the diagnosis

- If fasting plasma glucose >75mg/dl,
- First hour >180 mg/dl,
- Second hour >140mg/dl.

MATERIALS AND METHODS

A hospital based retrospective case control study was conducted in Kamineni Hospital, LB Nagar during 2018. Pregnant women diagnosed with gestational diabetes mellitus were taken as cases and pregnant women who completed 24 weeks of gestation and who tested negative on Glucose Challenge test (GCT) were selected as controls. Kamineni hospital is a tertiary level medical institute which is providing quality healthcare to citizens of Hyderabad for over two decades with distinction. It is a major referral centre for high risk pregnant women from Telangana and Andhra Pradesh. The women whose gestational age was >24 weeks and who had undergone glucose tolerance test (GCT) at the time of enrolment were taken as study subjects. Those having positive glucose tolerance test (GCT) were subjected to oral glucose tolerance test (OGTT) for confirmation or ruling out of GDM. So cases comprised those pregnant women who had abnormal OGTT. We included 100 GDM cases in the study who were registered during the year 2018. 100 cases were included in control group who had tested negative for GDM. Age, parity, family history of known diabetes mellitus, gestational diabetes in previous pregnancy, previous history of spontaneous abortions were studied to find out the strength of association with GDM.

RESULTS

1. High BMI i.e. between 25 to 30 is consistently associated with incidence of GDM
2. GDM affects upper (35%) and middle class (22%) more compared to women from low socioeconomic status (12%).
3. Progressing age acts as a factor for development of GDM. In age group above 30 years 26% in cases had GDM and only 12% in control group were having GDM. In age group above 30 years only 25% had GDM in age group <25 years compared to controls.

DISCUSSION

India has become the diabetic capital of the world. According to WHO projections, India will have maximum number of patients with diabetes (57.2 million) by the year 2025. Though prospective cohort study does establish epidemiology of risk factors in GDM, we preferred hospital based case control study because of time and resource constraints. 100 GDM cases diagnosed during the year 2018 were enrolled in the study which might have reduced selection bias of cases in the study.

Maternal age as risk factor: In the present study GDM was found to be more common (>76%) in the patients who were older than 25 yrs. The results were in accordance with the study done by Anna *et al* 18 (2008) which showed women aged 35- 39 years [OR-3.97, CI 3.80-4.16] had an approximately four times higher risk of GDM as compared to the age of 20-24 years. Similar results were also observed in study done by Rajput R *et al* 20(2009-11). The prevalence rate was higher in women aged 26-30 and >30 year (11.57% and 34.8%, respectively) compared to women aged 16-20 and 21-25 yr (4.54 and 4.53%, respectively) and this observation was found to be statistically significant (OR 3.79, CI 2.02-7.13). Another study by Zargar *et al* 21(1999-2002)8a showed that the prevalence of GDM steadily increased with advancing age. There was a significant difference (OR 3.5, CI 1.8-6.8) in the prevalence of GDM between women younger than 25 years and those 35 years or older, as the risk of GDM becomes significantly and progressively increased from 25 years onwards. This supports the American Diabetes Association recommendation on the use of age 25 years as the cutoff for screening and the observation that maternal age 25 years is the factor most predictive of GDM (Prof. Terence Lao, Department of Obstetrics and Gynaecology, Queen Mary Hospital, 102 Pokfulam Rd., Hong Kong)5a

Table 1: Risk of developing GDM according to age

Age	A	B
<25	25	45
25-30	49	43
>30	26	12
Total	100	100

BMI as risk factor: In our study 18, (18%) cases were found to be with BMI <25, 47 [47%] cases were having BMI between 25-30 and, 35 [35%] were with BMI above 30 in GDM group. In control group 32 (32%) were having BMI <25, 53 [53%] cases were having it between 25 -30 and 16 [16%] were having BMI >30. Increased BMI i.e. between range of 25 -30 and above 30 was prevalent in GDM group as compared to controls. As per study by Rajesh Rajput *et al* significant association was found between prevalence of GDM and increasing BMI of participants. Women having BMI >25 kg/m² had GDM

11 of 50 (22%) compared to 11 of 232 (4.7%) in women with BMI <18.5 kg/m². Ten of 60 (16.7%) women with pre-pregnancy weight above 60 kg were found to have GDM compared to 14 of 157 (8.9%) in women with weight between 51 and 60 kg, 16 of 291 (5.5%) in women with weight between 41 and 50 kg and only 3 of 99 (3%) in women with weight less than or equal to 40 kg. This trend of increasing prevalence with increasing pre-pregnancy weight was found to be statistically significant, Rajesh Rajput, yogesh yadav, smiti nanda and meena rajput *et al.*

Table 2: BMI as risk factor

	A	B
<25	18	32
25-30	47	52
>30	35	16
Total	100	100

Socioeconomic status as risk factor: In the present study the socio-economic status was found to be a risk causing factor of GDM. Around 59% cases belonged to upper and middle socio-economic status. Similar results were found in study by Rajput R *et al* 20 (2009-11) in which the prevalence of GDM was found to be higher in women belonging to upper and upper middle class (25% and 16.8%, respectively) and it was statistically significant (OR 5.48, CI 2.89-10.39) as compared to women belonging to lower middle class (4.6%) and upper lower class (3.4%). The higher risk of GDM in socio economically better group was probably because of more sedentary life style than the women belonging to lower socio economic class.

Table 3: Factor of socioeconomic status

	A	B
A	36	33
B	26	2
C	17	18
D	21	47
Total	100	100

Parity as risk factor: The present study showed association of GDM with increasing parity. Among the cases 31(31%) were having a parity > 3 while 9(9%) in control group had parity >3. This reinforces the fact that higher parity is associated with GDM. As per study by adel t., abu-heiaa frcog, maiuda r. al-bash, md moza. a. al-kalbani *et al* there was a steady increase in the incidences of positive OGCTs and GDM with increasing parity. The incidence of a positive OGCT was 21.2% in nulliparous women. This incidence increased steadily as parity increased, reaching 37.5% in women with parity ≥ 4. The incidence of GDM increased steadily from 3.5 in nulliparous women to 14.6% in women with parity ≥ 4.

As per study conducted by singh s, ray t k, in the GDM cases parity >3 the risk of developing GDM was 1.43 times as compared to controls. Comparable results were shown by Hoseini SSh22 *et al* (2011) which showed statistically insignificant association with GDM. (p = 0.10). However, a study in Riyadh, Saudi Arabia by Al-Hamaq A *et al* 23(2005-06) showed contrasting result in their study for multiparous women with OR- 8.29 to develop GDM than the nulliparous women. This contrasting result may be due to very high parity (>5) and large family size norms in Arabian nations.

Table 4: Risk of GDM according to parity

	A	B
More than 3	31	9
Less than equal to 3	69	91
Total	100	100

Age at menarche as risk factor: In present study group age at menarche did not appear significant risk factor as 53(53%) attained menarche at age <13yrs, 27(27%) attained it between 13-16 years and 19(19%) after 16 years. In control group 63(63%) attained menarche at age <13 years, 32(32%) attained between 13-16 years and 5(5%) attained it after 16 years. But as per study by Schoenaker DAJM, Mishra GD. Compared with women with menarche at age 13 years, women who had their first menstruation at age ≤ 11 years had a 51% higher risk of developing GDM (95% confidence interval: 1.10, 2.07) after adjustment for GDM risk factors. Their findings indicate that young age at menarche may identify women at higher risk of GDM. American journal of epidemiology association between Age at Menarche and Gestational Diabetes Mellitus: The Australian Longitudinal Study on Women's Health. Schoenaker DAJM, Mishra GD

Table 5: Age at menarche

	A	B
>13	53	63
13-16	28	32
<16	19	5
Total	100	100

Previous history of GDM as risk factor: A significant association between history of GDM in previous pregnancy and development of GDM in present pregnancy was found in our study. 14(12%) in study group had previous h/o of GDM while only 2(2%) cases had such past history in control group. Similar findings were noted by Shri devi A. S., Prema Prabhudev, Madhusoodana R. Bhovi *et al* in their study wherein the prevalence of GDM was more in women with advanced age, high BMI, positive family history of DM, past history of GDM and macrosomia.

Table 6: Previous history of GDM as risk factor

	A	B
Past history present	14	86
Past history absent	2	98
Total	100	100

Family h/o hypertension as risk factor: In the present study family history of hypertension has relevance as 23 (23%) from GDM had family h/o hypertension while only 14(14%) from control group had such history. As per study by rajesh rajput, yogesh yadav, smiti nanda and meena rajput *et al*³. On bivariate analysis, risk factors found to be significantly associated with GDM were age, educational level, socio-economic status, pre-pregnancy weight and BMI, weight gain, acanthosis nigricans, family history of diabetes mellitus or hypertension and past history of GDM.

Table 7: Family h/o hypertension

	A	B
Present	23	14
Absent	77	86
Total	100	100

CONCLUSION

According to WHO projections, India will have maximum number of patients with diabetes (57.2 million) by the year 2025(10). The clinical profile of GDM consists of factors like age, parity, family history of diabetes and hypertension. Present study elaborated that age. i.e., progressing age predisposes a pregnant women to GDM. Accordingly high BMI, between 25-30 is an asosscited with it. family history of Diabetes mellitus is also associated factor. These findings call for steps needed to modify factors like BMI in prevention of GDM. again treating physicians being aware of these influencing factors can follow treatment modalities such that complications due to GDM can be prevented.

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