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Research Article**GESTATIONAL DIABETES MELLITUS: INCIDENCE, RISK FACTORS AND OUTCOME IN ANTENATAL**

Jalpa Suthar *, Suchita Patel

**Department of Pharmacology, Ramanbhai Patel College of Pharmacy, Charotar University of Science and Technology, Charusat-campus, Changa, Gujarat, INDIA.*

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ABSTRACT

Aim: Gestational diabetes mellitus (GDM) is one of the most common medical disorders found in pregnancy, associated with significant metabolic alterations, increased maternal and perinatal morbidity and mortality. Objective was to found out the incidence, risk factor of GDM and outcomes in antenatal.

Materials and Method: A prospective observational study was carried out for a period of 7 months. Total 246 pregnant women between 24th to 28th weeks gestation were screened for GDM by DIPSI method.

Results: Total 10 patients were diagnosed with GDM out of 246 antenatal. The incidence of GDM was found to be 4.06 %. Risk factors of GDM such as age ≥ 25 years (30%), BMI ≥ 25 (30%), parity ≥ 3 (30%) were showed significant correlation in study. The most common maternal outcome was macrosomia followed by IUGR. Approximately 98% of the women had experienced one or more complains during the term of pregnancy. Anaemia (98.37%) was major complain followed by urinary tract infection 0.40% and non obstetric morbidities included vomiting 2.43%, pain in abdomen 9.34%, Diarrhea 1.62%, Cough 2.03% and fever 2.03%.

Conclusion: GDM is the most common metabolic complication in pregnancy that causes fetal mortality and morbidity. Parity, age, Body Mass Index (BMI) shows statistically significant correlation ($P < 0.05$) with association of GDM. Anemia was found predominant.

KEYWORDS : Gestational Diabetes Mellitus, Incidence, Risk factor, Maternal and Fetal outcome.

INTRODUCTION

Gestational diabetes mellitus (GDM) is a medical condition complicating pregnancy, and in the face of the rising prevalence of diabetes, particularly in women of child bearing age, the problem is growing [1,2]. GDM is defined as any degree of carbohydrate intolerance with the first recognition or onset during pregnancy, irrespective of treatment with diet or insulin, with or without remission after the end of pregnancy [3]. Gestational diabetes mellitus usually presents late in the second or during the third trimester [4]. The prevalence of GDM varies from 1-16% according to the diagnosis criteria and population. The prevalence of GDM is more in south India when compared to other part of India and Southeast Asia [5]. The risk factors for GDM are age > 30 years, family history of diabetes mellitus,

obesity, history of macrosomia, glycouria, previous unexplained neonatal death, unexplained recurrent abortion, Previous congenital malformations, history of hydramnios, history of stillbirth, history of gestational hypertension and history of pre-eclampsia [6]. Maternal complications are Pre-eclampsia and cesarean delivery. Fetal complications are shoulder dystocia, birth injuries, neonatal hyperbilirubinaemia, hypoglycemia and respiratory distress syndrome [7].

Many women do not die of causes related to pregnancy but suffer severe morbidities [8]. The world development report estimated that 18% of the burden of disease for these women is due to maternal causes [8]. The World Health Organization (1992) has defined obstetric morbidity as morbidity among women who have been pregnant (regardless of site or duration of the pregnancy) from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes [9,10]. Obstetric morbidity is one of the major causes of maternal death [8].

Maternal morbidity is defined as morbidities that occur during pregnancy or childbirth within 42 days after giving birth. They can be acute, or chronic, lasting for months or even years. Many of these are conditions that may cause difficulty in pregnancy, and aggravate existing morbidities, which can lead to more severe consequences for women. Improving maternal

Corresponding author:*Jalpa Suthar**Department of Pharmacology,
Ramanbhai Patel College of Pharmacy,
Charotar University of Science and Technology,
Charusat-campus, Changa, Gujarat, INDIA.* E-Mail: jalpasuthar.ph@charusat.ac.in

DOI:

health is one of the eight-millennium development goals (MDGs). Under MDG5, countries committed to reducing maternal mortality by three-quarters between 1990 and 2015. Since 1990, maternal deaths worldwide have dropped by 47% [11].

Review of current data suggests that, Indian women have the highest frequency of GDM necessitating universal screening. Pregnancy is more relevant as Indian women have 11-fold increased risk of developing GDM compared to other places. As a result to know the risk factors and the prevalence of GDM in pregnant women at the rural area study is planned for Antenatal in Rural Anand District of Gujarat. Moreover, outline the common health outcome in pregnant women. India has the largest number of diabetes patient in the world with an estimated number of 46 million in women in India are in reproductive age are affected by diabetes. However there has only little data study in India on gestational diabetes mellitus. Hence the study was planned to find out the incidence, risk factors and outcomes in gestational diabetes mellitus.

MATERIALS AND METHODS

A prospective observational study was conducted on pregnant women attending to outpatient department of obstetrics and gynaecology, at Community Health Centre, Sarsa over a period of 7 months from June 2016 to December 2016. Pregnant women between (24th to 28th) weeks of gestation were included in the study. Cases having known diabetics, or who were suffering from any chronic illness were excluded from the study.

All antenatal were screened for GDM by DIPSI method. All pregnant women were given 75 g of glucose irrespective of their last meal. Venous plasma glucose was estimated after 2 hours, and cases with 2 hours plasma glucose value ≥ 140 mg /dl were diagnosed as having GDM. All GDM patients were followed up and treated with medication and diet till delivery by specialist. Data were analyzed and further evaluated for the incidence, risk factors and outcome of GDM.

Data Collection: (For morbidity Pattern):

Data were collected for the period of June 2016 to December 2016. The data were collected directly from patients, family members, inpatient files and outpatient medical records, maternal data include age, weight, height, obstetric history, treatment, laboratory investigation and current diagnosis details were collected.

Statistical Analysis: All statistical analysis was performed using the Statistical Package for the Social Science (SPSS) version 23. Categorical analyses were performed using Microsoft Excel 2007. Data are expressed as percentage. To assess the maternal and fetal outcomes in different group patient chi square test was used p value less than 0.05 was considered as statistically significant.

RESULTS

Gestational Diabetes Mellitus:

A total 246 pregnant women who attended antenatal clinic during the period of June 2016 to December 2016 were enrolled in the study.

Among 246 pregnant women, 10 (4.06%) women were diagnosed with gestational diabetes mellitus.

Out of 246 antenatal women population, the mean age of pregnant women was 23.8 ± 9 (S.D 3.62) years, the highest number of patients 51.62% were from the age group 21-25 years which constituted 22.76% of the study population. Out of which, 10 (4.06%) were diagnosed as having GDM using the DIPSI method. There was no statistically significant association between age and GDM ($P > 0.05$) (Table 1).

Table 2 shows parity information of patients, out of 246 women, 170 (69.10%) women were found to have null parity, 52 (21.13%) patients had 2 parity, 24 cases were multigravida (9.75%). There was a significant correlation between GDM and gravida (≥ 3) ($P=0.028$).

In our study, 17 (6.91%) patient had been considered as overweight and 7 (2.84%) were obese women. There was no significant correlation between GDM and Body Mass Index (BMI) ($P > 0.05$) (Table.3).

In our study, parity ≥ 3 ($P = 0.028$) and age ≥ 25 with BMI ≥ 25 kg/m² ($p = 0.023$) showed statistically significant correlation with GDM. Out of 10 cases of GDM, 50% ($n = 5$) of antenatal showed one or more risk factor, while remain 5 cases were without any risk factors shown in table.4.

In GDM patients, minimum birth weight observed was 2.4 kg and the maximum birth weight observed was 4.39 kg in the study. Table 5 represents the mode of pregnancy outcome.

Table No. 1: Distribution of cases according to age and occurrence of GDM

Age Group (Years)	No. of Cases (n=246)	Non GDM (n=236)	GDM (n=10)	Chi square test (P value)
16-20	56(22.76%)	55(23.30%)	1(10%)	0.326
21-25	127(51.62%)	121(51.27%)	6(60%)	0.589
26-30	63(25.60%)	60(25.42%)	3(30%)	0.745

Table No. 2: Distribution of cases according to gravida and occurrence of GDM

Gravida	No. of Cases (n=246)	Non GDM (n=236)	GDM (n=10)	P value
G1	170(69.10%)	165(69.91%)	5(50%)	0.182
G2	52(21.13%)	50(21.18%)	2(20%)	0.928
$\geq G3$	24(9.75%)	21(8.89%)	3(30%)	0.028*

* Significance

Table No. 3: Distribution of cases according to Body Mass Index (BMI) and occurrence of GDM

Category	No. of Cases (n=246)	Non GDM (n=236)	GDM (n=10)	P value
≤ 23	222(90.24%)	214(90.67%)	8(80%)	0.265
25-29.99	17(6.91%)	16(6.77%)	1(10%)	0.694
≥ 30	7(2.84%)	6(2.54%)	1(10%)	0.165

Table No. 4: Prevalence of risk factor in study population

Risk factors	No. of Cases (n=246)	Non GDM (n=236)	GDM (n=10)	P value
Age (≥ 25)	99(40.24%)	95(40.25%)	4(40%)	0.987
Parity (≥ 3)	24(9.75%)	21(8.89%)	3(30%)	0.028*
BMI (≥ 25 kg/m ²)	22(8.94%)	20(8.47%)	2(20%)	0.080
Age ≥ 25 + parity ≥ 3	23(9.34)	21(8.89%)	2(20%)	0.238
Age ≥ 25 + BMI ≥ 25 kg/m ²	12(4.87%)	10(4.23%)	2(20%)	0.023*

* Significance

Table No. 5: Pregnancy outcomes in GDM cases: (N=10)

Sr. No	Pregnancy Outcome	No. of patient
1	Normal Delivery	6
2	Caesarean section	4
3	Macrosomia (birth wt > 3.45Kg)	3
4	IUGR	1

Morbidity Pattern study:

In maternal morbidity study, out of 246 pregnant women who attended antenatal clinic, in which 243 (98.78%) women were having at least one morbidity symptoms. Distribution of maternal morbidity in antenatal (N=246) represented in figure 1.

In present study, total 10 types of morbidity found in study population during the study. Total 246 antenatal were

visited at CHC among them 243 women had presented with at least one morbidity symptoms. Anaemia was found to be a top most morbidity in pregnant women with the prevalence of 98.37% followed by abdominal pain 9.34% (n=23), Gestational Diabetes Mellitus 4.06% (n=10), vomiting 2.43% (n=6), cough 2.03% (n=5), fever 2.03% (n=5), diarrhoea 1.62% (n=4), and Urinary Tract Infection 0.40% (n=1). Rural population may be a reason for getting high prevalence of Anaemia.

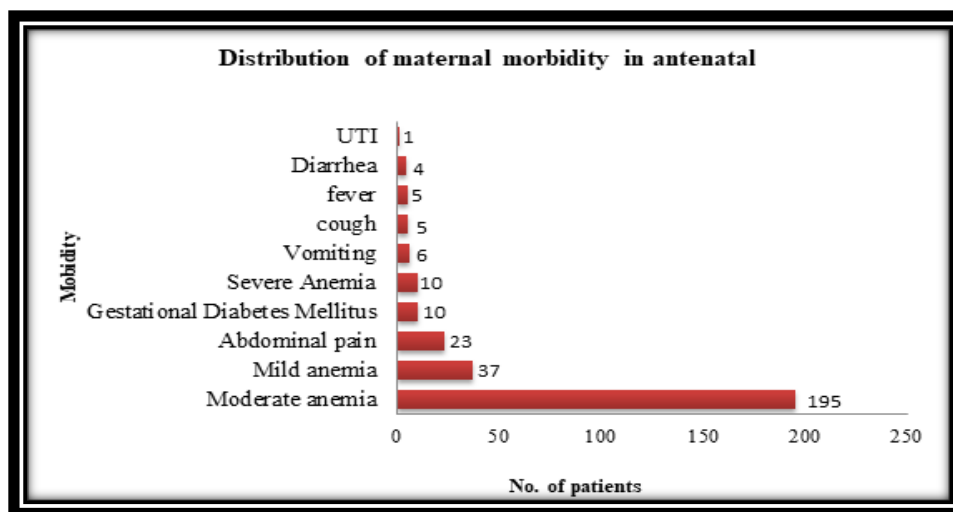


Fig. 1: Distribution of maternal morbidity in antenatal

Table No. 6: Prevalence of Anaemia in the antenatal

Sr. No	Types of anemia	No. of patient (n,%)	Avg. Hb level (%gm/dl)
1	Moderate	195 (79.26%)	8.55
2	Mild	37 (15.04%)	10.14
3	Severe	10 (4.06%)	5.95
4	Normal	4 (1.62%)	11.35
5	Total	246 (100%)	--

Reference range: Severe anemia- < 7 gm/dl, Moderate anemia- 7-9.9 gm/dl, Mild anemia- 10-10.9 gm/dl, Normal Hb level- 11-15 gm/dl

As depicted in Table.6, in present study, higher prevalence of anaemia found during study period. Among 246 patients, only 4 patients had normal haemoglobin level followed by 79.26% (n=195) had moderate type of Anaemia, 15.04% (n=37) patients had mild, 4.06% (n=10) patients had severe. Anaemia was classified according to the WHO defined criteria.

DISCUSSION

Gestational Diabetes Mellitus (GDM) attributes high risks for mother and child, mother have a GDM are led to need caesarean delivery due to macrosomia (≥ 3.45 Kg). Diabetes in pregnancy study group India (DIPSI) procedure of diagnosis is a modified version of the WHO criteria. The WHO procedure requires the women to be in fasting, whereas DIPSI procedure is performed irrespective of the last meal timing [18]. DIPSI procedure is a one step procedure which screens as well as and diagnoses GDM. It is simple, economical and feasible. To prevent complication in pregnancy the morbidity study is highly useful for reduce risk during pregnancy; it is very effective for healthy life for both mother & fetus. During pregnancy women suffer severe obstetric and non obstetric morbidities so early monitoring and check-up to antenatal is most effective to reduce mortality.

Incidence:

In our study, incidence of GDM was found to be 4.06%. As per record approximately 1-14% of all pregnancies are diagnosed with GDM and the prevalence also keep increasing from year to year [16]. In present study, less incidence was found compare to other studies conducted by Dr. Alpana Singh, et al. [12], and Sedigheh Soheilykhah, et al. [13], it shows incidence rate 5.7 % and 10.2% respectively.

Risk factors:

Study of risk factor in GDM could be one of the useful tools to prevent further complication and better intervention. Women have age more than 25 year is being considered as highly risk factor for GDM. In presence study, mean average age of GDM patient was 23.8 ± 9 years. In Rajesh Rajput, et al. [14], study found 23.62 ± 3.42 year. In our study 60% (n=6) women were between age 21-25 years, followed by 30% (n=2) in 26-30 years, 10% (n=1) women between 31-35 years and 10% (n=1) were 16-20 years in age. Multiple studies supported the idea that GDM appears more frequently in pregnancy after the age 25 because of age-related metabolic changes like increased BMI, hypertension and dyslipidemia and it is rare before age 20. In present study 40% (n=5) GDM cases were in age group ≥ 25 years. K.Ramalingam et. al. [15], study found 61.9% of GDM cases at same age group.

The increase in BMI is also considered as risk factor for GDM because considering hormonal imbalance changed carbohydrate regulation mechanism and insulin sensitivity. In our study average mean of BMI of GDM women was 24.20 ± 5 kg/m². This finding similar to study by Sneha, et.al. [17], which reported 25.5 kg/m² BMI. Our study, 30% (n=3) cases of GDM were had BMI ≥ 25 kg/m², which is in accordance with a study done by Binny Thomas et al. [16], showing BMI ≥ 25 kg/m² more prevalent 53.60% in GDM subjects. In our study, BMI is one of the risk factors show significant (p= 0.023) correlation with GDM.

Parity and gravida are high risk of GDM in pregnancy. In our study 30% GDM pregnancy had in 3 multigravida when compared to primigravida 50% (5). In Sneha, et al. [17], study found multigravida 52.1% when compared to primigravida 41.3% [19]. In present study significant correlation (p=0.028) between parity and GDM was showed.

Complication:

Chances of complication in term of outcome would be increased in GDM. In GDM cases the rate of caesarean section was high due to macrosomia. In present study 60% (n=6) of GDM cases were delivered vaginally while 40% (n=4) cases required a caesarean section, which is in agreement with a similar study from Archit Dahiya et al. [4], showing 60% spontaneous vertex deliveries, and 40% lower segment cesarean section (n=500) in women with GDM.

In our study macrosomia i.e. babies with birth weight ≥ 3.45 kg was observed in 30% (n=3) newborns of GDM mothers. A study conducted by Vedavathi KJ et al. [19], on Influence of GDM on Fetal growth parameters concluded that despite the attempts for good glycemic control there is a risk of macrosomia in GDM.

Intra uterine Growth Retardation (IUGR) is one of the complication in fetal outcome in GDM women in which baby weight was < 2.5 kg. In present study one case shows IUGR baby while in K.Ramalingam, et al. [15], found 2 (2.8%) in fetal outcome in GDM women.

Morbidity:

During study period -June 2016 to December 2016 at CHC total 246 antenatal were visited. Among them 243 women had presented with at least one morbidity symptoms. To evaluate maternal morbidity is highly effective to antenatal for maternal causes and fetus. WHO has estimated that the prevalence of anemia is 14% in developed and 51% in developing countries, where as in India it is 65-75%. Our study revealed a high prevalence of anemia 98.78% among pregnant women in rural area.

Almost all patients were uneducated and unaware of diet which must be taken during pregnancy to fulfill the nutritional support for mother and development of fetus. This may be one of reason for high prevalent anemic condition in rural population. Majority of the study population has a moderate degree of anemia 195 (79.26%) which Hb level range from (7-9.9 g/dl) followed by 37 (15.04%) had mild anemia (10-10.9 g/dl), 10 (4.06%) had severe anemia (< 7 g/dl), and 4 (1.62%) of pregnant women have normal range of hemoglobin.

In our study Obstetric morbidity like Urinary Tract Infection was found to be 0.40%. The common non obstetric morbidities present were vomiting, diarrhea, cough, fever, and abdominal pain etc.

CONCLUSION

Gestational Diabetes Mellitus (GDM) is the most common metabolic complications of pregnancy, and causes fetal mortality and morbidity and had incidence rate 4.06% in our study. DIPSI guideline is most useful, cost effective procedure for diagnosis of GDM. Increasing age, BMI and parity showed significant correlation on developing gestational diabetes mellitus.

Anemia was found to be a top most morbidity in pregnant women with prevalence of 98.37% in rural population. Other morbidities like UTI, vomiting, diarrhea, cough, fever and abdominal pain were observed during study period.

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