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Prevalence, Clinical Profile and Outcome of Gestational Diabetes Mellitus

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Summary

In this prospective study, 300 randomly selected women with24 to 32 weeks of gestation were screened for GDM by 50 gm oral glucose test. Of the 61 (20.33%) cases, which screened positive, 27 were confirmed to have GDM on OGTT. Thus the prevalence of GDM in the study was 9%. All cases were followed for maternal, fetal, neonatal complications and outcome of pregnancy. The GDM negative pregnancies served as controls.

Established risk factors were found more frequently in GDM group. 11.1% women without any risk factor also developed GDM.

Among the maternal complications, excessive weight gain (32% v/s 1.7%), pregnancy induced hypertension (48% v/s 18.8%), hydramnios (28% v/s 4.3%), and vulvovaginitis (4% v/s 1.3%) were found more commonly in GDM group when compared to control group. In fetal complications, intrauterine fetal death (12% v/s. 1.7%), malpresentations (16% v/s 6%) and IUGR (16% v/s 6%) were more commonly associated with GDM than with controls. When a comparison of neonatal complications was made, macrosomia (32% v/s 6.8%), and major congenital anomalies (8% v/s 0.9%) were more in GDM group. In GDM group 44.4% women required Caesarean section, compared to only 13.3% in non-GDM group.

Introduction

Prevalence of NIDDM in adult population of India is high. Adult females, who have inherited genetic predisposition to NIDDM, would be at risk of developing GDM during pregnancy. Many of these remain undiagnosed due to asymptomatic nature of disease and absence of routine screening for GDM. GDM is responsible for significant maternal, fetal and neonatal morbidity and mortality. Complications of GDM cause undue burden on already over-stretched obstetric care in our country.

Indian data on prevalence and complications of GDM is scanty. This study was planned to find prevalence, clinical profile and outcome of GDM in a medical college hospital of central India.

Material and Methods

The study was conducted in Sultania Hospital, Department of Obstetrics and Gynecology, Gandhi Medical College, Bhopal. Three hundred randomly selected women between 24 to 32 weeks of gestation were recruited to the study. Women who had pre gestational diabetes or any cardiac, respiratory, renal or hepatic disease were excluded. Women on drugs like corticosteroids and progestogens were also excluded

The study population was subjected to 50gm oral glucose challenge screening test for GDM. Venous serum glucose value of 140mg/dl or more was considered positive. The women who tested positive on screening test were subjected to 100gm OGTT applying O' Sullivan et al 1973 criteria for confirmation of GDM.

The study population was divided accordingly into two groups of GDM positive and GDM negative. Out of 300 cases, 45 were lost at various stages of follow-up and 255 cases completed the study.

A detailed clinical analysis, including risk factors for GDM was recorded in each case. Cases were closely followed for complications, of GDM. The outcome of pregnancy and any neonatal complication were recorded in both groups. A percent wise comparison was made for various parameters between two groups.

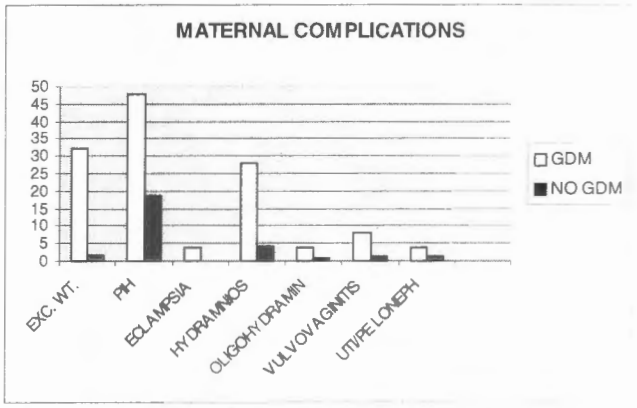
Observations

Out of 300 women recruited to the study 61(20.33%) turned out positive on screening test. Thee screening test positive women, when tested for confirmation of GDM by OGTT, 27 women had confirmed GDM. Thus, the prevalence rate of GDM in the study population was 9%. Only 44.3% women with screening test positive results, confirmed to have GDM on OGGT test.

Age wise distribution: Table No. 1 shows the percentage wise distribution of GDM positive and GDM negative cases in various age groups.

Risk factors : Risk factors recorded and their percentage wise frequency and comparison in two groups, is depicted in Table No. II.

Maternal Complications: The maternal complications recorded were; excessive weightgain, pregnancy induced hypertension, eclampsia, hydramnios, oligo hydramnios, vulvovaginitis and UTI or pyelonephritis. The relative percentage wise frequency of various maternal complications is shown in Fig. No. I.



	EXC Wt.	PIH	Eclamsia	Hydramnios	Oligohydramn	Vulvovaginitis	UTI/PYELoneph
GDM+	32	48	4	28	4	8	4
No GDM	1.7	18.8	0	4.3	0.9	1.3	1.3

Fig. 1

Table I
Distribution of GDM +ve / GDM-ve Cases According to Age

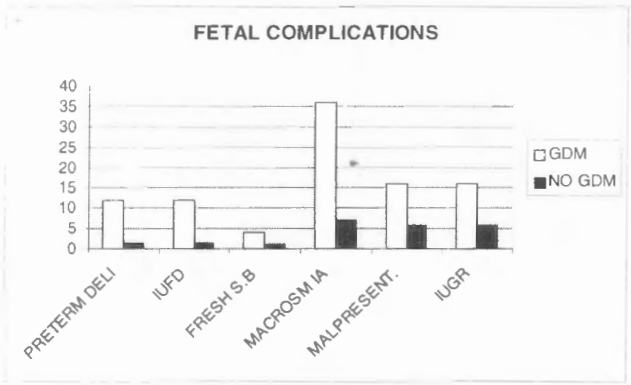
Age in Years	16-20	21-25	26-30	31-35	36-40
GDM +ve (%)	0	2.3	16.4	22.5	42.5
GDM –ve (%)	100	97.7	83.6	77.5	57.1

Table II
Prevalence of Various Risk Factors in Two Groups

Risk Factor	% of women having Risk factor in GDM group	% of women having risk factor in control group
P/H of GDM	22.2	0.37
F/H of Diabetes in 1* Relative	22.2	8.4
P/H of Macrosomic Newborn	29.6	2.9
P/H of Cong. Malformed Baby	3.7	2.2
P/H of Still-birth	18.5	9.2
P/H of Abortion	25.9	2.2
P/H of PIH	29.6	6.2
P/H of Eclampsia	0	1.5
Obesity	33.3	2.9
P/H of Neonatal Complication	0	0.37
P/H of Neonatal Death	18.5	6.2
Hypertension	7.4	0
Age>30 years	44.4	11.7
No Risk Factor	11.1	45.1

(P/H = Past History, F/H = Family History)

Fetal Complications: Preterm delivery, intrauterine fetal death, fresh stillbirth, fetal macrosomia, malpresentation and intra-uterine growth retardation were recorded. Reltive frequency of each of them in two groups is shown in Fig. No. 2.

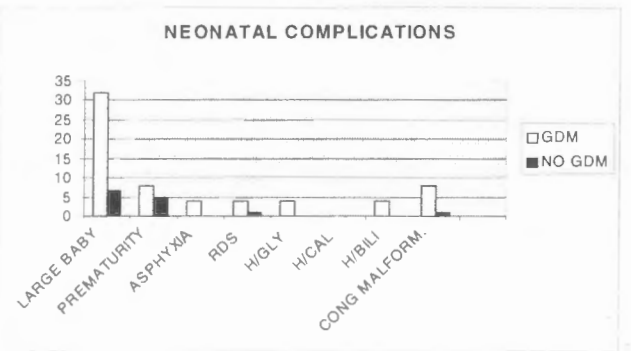


	Preterm Deli.	IUFD	Fresh S.B.	Macrosm IA	Malpre Ent.	IUGR
GDM+	12	12	4	36	16	16
No GDM	1.7	1.7	1.3	7.3	6	6

Fig. 2

Mode of delivery : Caesarean section was required in 44.4% mothers having GDM while only 13.3% mothers without GDM required LSCS.

Neonatal complications: Newborns with birth-weight more than 3.5 kg was considered macrosomic. Hypoglycemia and hypocalcemia were sought in neonates who had convulsions. All neonates were screened for any major congenital abnormality. Fig. No. 3 shows the percentage wise frequency of these complications in both groups.



	Large Baby	Premat urity	Asphyx ia	RDS	H/gly	H/Cal	H/Bili	Cong. Malform.
GDM+	32	8	4	4	4	0	4	8
No GDM	6.8	5	0	0.9	0	0	0	0.9

Fig 3

Discussion

In our study, the prevalence rate of GDM was 9%. The study population comprised of predominantly lower and middle income group urban mothers. Prevalence of NIDDM in urban Indian adult population is more than 10%. The frequency of genetic predisposition to NIDDM in women of reproductive age group is expected to be high.[5] These women during pregnancy are likely to develop metabolic decompensation leading to GDM. Table no. III shows the prevalence of GDM in recent studies in literature.

Table III
Prevalence of GDM in Recent Studies

Year	Author	Place/Population	Prevalence
1995	Engelgau et al	U.S.	4.0%
1994	Moses et al	New South Wales	7.2%
1994	Moses et al	New South Wales, Asians	11.9%
1994	Miselli et al	Scandinavia	2.4%
1994	Fraser et al	Israel, Jewish	5.7%
1994	Fraser et al	Israel, Bedouins	2.4%
1994	Ramachandran et al	Chennai, India	0.56%
1997	Present study	Bhopal, India	9.0%

In contrast to high prevalence reported in other studies Ramchandran et al in 1994 reported a very low figure of 0.56%. OGGT confirmed GDM, although in their group of 950 mothers 9.4% were positive on screening test. This wide difference in between screening test and confirmed GDM is unexplained. Almost all cases of GDM belong to incipient NIDDM, the usual age for onset of which is around 40 years. It is therefore expected that risk of GDM would increase with age. This was clearly seen in the present study, as 44.4% women with GDM were above 30 years of age. This reemphasizes that age more than 30, is a strong risk factor for GDM. Other risk factors, which were strongly associated with GDM, are, past histories of GDM, macrosomic newborn, stillbirth, abortion, PIH, and neonatal death. Similarly, family history of diabetes in first degree relative and presence of obesity or hypertension were also strongly correlated to GDM. There was no risk factor in 11.1% mothers having GDM. This emphasizes a need for universal rather than risk factor based screening for GDM.

Maternal complications: Weight gain of more than 1 kg per month in second trimester and more than 2 kg in third trimester was considered excessive. Thirty two percent mothers in GDM group as compared to 1.7% in non-GDM group had excessive weight gain. Pregnancy

induced hypertension (PIH) was seen in 48% mother with GDM as against 18.8% in non-GDM mothers. Siddgi et al (1991) reported the incidence of 15% of PIH in pregnancy with diabetes. Upadhyay et al (1975) reported incidence of PIH in rural Indian population, irrespective of diabetes, as 10%. Our hospital being a tertiary referral center, there was a higher preponderance of complicated pregnancies in both groups. Only one woman in GDM group developed eclampsia. Hydramnios was deected in 28% mothers with GDM as compared to 4.3% in non-GDM mothers.

Fetal complications: Intrauterine fetal death or fresh stillbirth was recorded in 16% mothers in GDM group in spite of proper treatment of diabetes. The figure for non-GDM mothers was only 3%. Fetal macrosomia on USG was present in 36% mothers with GDM against 7.3% in non-GDM. Weingold (1978) reported a meta-analysis of various studies on fetal macrosomia and reported that its incidence varies from 20 to 60% in pregnancies complicated by diabetes.

Neonatal complications: We found neonatal macrosomia in 32% deliveries of GDM positive mothers, in spite of our efforts, to keep a good diabetic control throughout the pregnancy. Only 6.8% mothers in non-GDM group gave birth to macrosomic babies. Naylor et al (1996) reported 28.7% incidence of neonatal macrosomia in their study. Two neonates born to mothers with GDM had major congenital abnormalities in our study. One had anencephaly and died soon after birth and another had meningomyelecoele. Grall and Laurant (1994) published a retrospective analysis of outcome of pregnancies, between 1977 to 1990 from New Castle General Hospital. They reported that incidence of major congenital abnormalities was 17.3% in pregestational diabetes, 9.8% in GDM and 2.2% in general population.

Mode of delivery: For various obstetric reasons, 44.7 GDM positive mothers underwent Caesarean sections, compared to 13.3% mothers without GDM. In GDM positive mothers who required LSCS, 8 had cephalopelvic disproportion, one had fetal distress and two had severe PIH with non-progress of labour

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