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Study of Maternal and Perinatal outcome in Pregnancies Complicated by Gestational Diabetes Mellitus

KEYWORDS: GDM, Pregnancy, Outcome.

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ABSTRACT *Background: GDM is a serious condition, affecting both the maternal & neonatal outcomes during pregnancy.*

Objective: To analyze maternal & perinatal outcome in pregnancies complicated by GDM.

Methodology: All pregnant ladies diagnosed with GDM were studied & relevant maternal & fetal outcomes were assessed using predefined indicators.

Observations: Prevalence of GDM was 0.55%. Maximum cases were 25-29 years old (58.6%) & were either Nulliparous (43.7%) or Primiparous (40.2%). Mean gestational age for GDM group was 37.44+1.41 weeks & 38.42+1.46 weeks for controls. Hyperbilirubinemia was the commonest neonatal adverse outcome in both GDM & control groups. All 87 GDM women returned to normal glycemic levels in post-partum period.

Conclusion: Women with GDM are at increased risk of maternal & neonatal complications. All pregnant women should be screened for glucose intolerance.

INTRODUCTION

Diabetes is one of the largest global health emergencies of 21st century. Globally, an estimated 422 million adults were living with diabetes in 2014, compared to 108 million in 1980 [1]. India is home to around 69 million diabetics; which is estimated to go up to a whopping 123.5 million by 2040 [2].

Diabetes is known to affect pregnancy badly, with both maternal & neonatal adversities. The prevalence of GDM is increasing [3], and was approximately 9% in the period 2007–2010 in the US [4]. Similar prevalence has been reported from other countries [5,6]. Situation has been reportedly worse in India, with prevalence estimated at 16.55% [7] & 21.6% (GDM+IGT) [8]. Gestational Diabetes Mellitus (GDM) is defined as "any degree of glucose intolerance with beginning or diagnosis established for the first time during pregnancy" [9].

Recent data from the HAPO study [10] reported adverse maternal & perinatal outcomes even in blood glucose levels previously thought safe. But data from our country is scarce. This study is conducted with the objective of determination of maternal & perinatal outcome in pregnancies complicated by GDM.

METHODOLOGY:

- **Study Design:** Institute based observational study
- **Study setting:** Tertiary care Institute.
- **Study period:** November 2009 to October 2011.
- Inclusion Criteria-

All pregnant ladies attending ANC OPD diagnosed with GDM with Carpenter & Coustan Criteria [11].

Registered & delivered at study institute with regular antenatal follow-up

- **Exclusion Criteria-** Presence of-

Pregestational diabetes

- Multiple gestations

Chronic medical/surgical condition or long term intake of medications affecting glucose metabolism

- **Controls:** Age/parity matched pregnant women with no chronic illness.

All eligible cases during the study period (Total 87 cases) were recruited & matched in 1:1 ratio with controls without GDM. Evaluation with detailed history, examination & baseline investigations (including obstetric ultrasound) was undertaken. Follow-up schedules & time/mode of delivery were individualised according to patients. All the relevant maternal & fetal outcome was assessed using predefined indicators.

A structured & pre-tested proforma was used to collect data after taking informed consent from subjects.

RESULTS:

For the total of 87 GDM cases, the gross total number of patients booked & delivered at the tertiary care institute were 15801. Thus the prevalence of GDM comes out to be 0.55%. Maximum cases (58.6%) were 25-29 years old & were either Nulliparous (43.7%) or Primiparous (40.2%). The BMI for cases mostly ranged from 25-29.9 (47.1%) or 20-24.9 (34.5%); whereas it majorly hovered around 20-24.9 amongst controls (57.5%) followed by < 19.9 (24.1%).

There was significant difference between groups for family history of GDM (49.4% amongst cases, 14.9% amongst controls, $p<0.001$) & previous history of abortion (35.1% amongst GDM multipara, 13.7% amongst control multipara, $p=0.002$). 51 (58.6%) cases were diagnosed as GDM

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during 2nd trimester & 36 (41.4%) during 3rd trimester. 35 (40.0%) GDM patients were managed with Diet only, whereas 52 (60.0%) required Diet + Insulin.

Pre-eclampsia was the most common associated condition in both the groups (GDM group- 21.8%; control group- 8.1%), the difference being statistically significant (p=0.011).

Table 1: Distribution of Participants as Per Associated Obstetric Complications

Complications	GDM Group		Control Group		p-value
	No	%	No	%	
Pre-eclampsia	19	21.8	7	8.1	0.011
Polyhydramnios	9	10.3	1	1.2	0.015
Spontaneous pre-term labour	9	10.3	3	3.5	0.073
Vaginal Candidiasis	9	10.3	0	0	0.002
Post-partum haemorrhage	2	2.3	0	0	0.155
Puerperal Sepsis	1	1.2	0	0	0.081

In the GDM group 28 (32.2%) cases delivered vaginally and LSCS was done in 59 (67.8%) cases. The same in control group was 68 (78.2%) & 19 (21.8%) cases respectively. Cesarean section occurred significantly more in cases of GDM as compared to control group (p<0.001). In the GDM group 43 (72.9%) cases underwent elective LSCS & 16 (27.1%) cases had to undergo emergency LSCS. The same in control group was 5 (26.3%) & 14 (73.7%) cases respectively. Elective LSCS was significantly more in GDM group as compared to controls (p<0.001). A majority of participants (73.3% cases & 88.5% controls) delivered between 37 & 40 completed weeks of gestation. The mean gestational age for GDM group was 37.44+1.41 weeks, while it was 38.42+1.46 weeks, the significant difference being there presumably due to early induction due to associated complications.

Distribution of participants according to birth weight of the neonates showed it to be significantly higher in GDM group (mean- 2.86+0.54Kgs) as compared to controls (mean- 2.53+0.45Kgs). There were more number of neonates with birth weight between 3-3.4Kgs in GDM group than in controls [28 (29.89%) vs 7 (8.05%)].

Table 2: Distribution of participants according to birth weight of babies

Birth Weight	GDM Group		Control Group	
	No.	%	No.	%
<2Kgs	3	3.5	11	12.6
2-2.4Kgs	18	23.0	27	31.0
2.5-2.9Kgs	27	31.0	39	44.8
3-3.4kgs	28	29.9	7	8.1
3.5-4Kgs	9	10.4	3	3.5
>4Kgs	2	2.3	0	0.0
Total	87	100	87	100

Distribution of participants according to neonatal outcome revealed; in GDM group, 18 (20.7%) cases had hyperbilirubinemia, which was by far the most common adverse neonatal outcome. It was also the most common adverse outcome amongst controls 9 (10.4%) also. No significant difference was observed in the incidence of neonatal complications between the two groups.

Table 3: Distribution of Participants according to adverse neonatal outcome

Complications	GDM Group		Control Group		p-value
	No	%	No	%	
Hyperbilirubinemia	18	20.7	9	10.4	0.089
Respiratory Distress Syndrome	3	3.5	2	2.3	0.650
Neonatal Death	3	3.5	2	2.3	0.081
Hypoglycemia	2	2.3	0	0.0	0.155
Macrosomia	2	2.3	0	0.0	0.155
Neonatal Septicemia	2	2.3	0	0.0	0.065
Congenital Anomalies	1	1.5	0	0.0	0.155

As for NICU stay of study subjects, 24 (27.6%) neonates among GDM group & 11 (12.6%) neonates among control group had to be admitted to NICU for management of complications, the difference being significant. The commonest indication for NICU admission in both GDM & control group was hyperbilirubinemia. The median stay in NICU for GDM group cases was 5 days (range- 1-35), which was significantly higher than that in controls with 5 days median stay (range- 1-7).

All the 87 (100%) women with GDM returned to normal glycemic levels in the post-partum period.

DISCUSSION:

The prevalence of gestational diabetes in the present study was 0.55%, which is comparatively lower w.r.t. to previous similar studies (Savona Ventura C- 1.81% [12], Al-Hakeem M- 8.6% [13]). Mean age at diagnosis of GDM was 27.68 years, which is similar to other studies [14], [15]. 83.9% of GDM cases were of low parity & only 16.1% were multiparous; which is in sync with findings of Odar [15]. In our study, 47.1% of GDM cases were overweight/obese, a finding supported by numerous previous studies of repute.

Previous obstetric outcomes was shown to have correlation with GDM in present study, similar to what was reported by Garshasbi et al [16] & Nezhad et al [17], who also reported family history of diabetes, history of still birth & abortion, among others, to be contributory towards GDM.

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In the present study, there were 21.8% cases of PIH among GDM group while only 8.1% cases among control group, the difference being statistically significant. Similar findings were reported by Odar[15], which reported 4 times the prevalence of PIH in GDM group as compared to controls. In our study maternal outcome in GDM mothers doesn't differ from controls. Boriboonhirunsarn [18] & Jaiwong [14] also concluded that women with GDM who were diagnosed & treated with standard treatment guidelines demonstrated no severe maternal & neonatal complications.

In our study, mean gestational age at delivery for GDM group was 37.44 weeks & for controls was 38.42 weeks, the difference being significant. This is in agreement with studies by Johns et al [19] & Boriboonhirunsarn [18]. The rate of caesarean section was significantly higher among GDM group; which is what was reported earlier as well. [19], [12]

Our study revealed that hyperbilirubinemia was the commonest complication in GDM leading to NICU admission, which is in agreement with findings of Johns et al [19]. The significant difference in birth weights of the neonates between the two groups was in agreement with what was reported by Boriboonhirunsarn [18] & Odar [15].

Al Hakeem M. [13] & Jaiwong [14] observed that with tight control of blood glucose, there was excellent neonatal outcome in women with GDM; a finding confirmed by the present study.

CONCLUSION:

Women with GDM are at increased risk of maternal & neonatal complications. Early diagnosis, intensive pregnancy management and fetal surveillance is important to decrease such complications. All pregnant women should be screened for glucose intolerance, in view of the serious consequences otherwise.

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