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Original Research Article

Evaluation of Pregnancy Outcomes in Gestational Diabetes Mellitus

Anuradha Mishra[1], Mamata Oram[2], Bibekananada Rath[3], Prativa Sahu[4]

[1]Assistant Professor, Department of Obstetrics and Gynaecology, MKCG Medical College, Berhampur, Odisha.
[2]Assistant Professor, Department of Obstetrics and Gynaecology, MKCG Medical College, Berhampur, Odisha.
[3]Senior Resident, Department of Obstetrics & Gynaecology, MKCG Medical College, Berhampur, Odisha.
[4]Senior Resident, Department of Obstetrics and Gynaecology, MKCG Medical College, Berhampur, Odisha.

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Corresponding author: Dr. Prativa Sahu,
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Abstract

Background: In this study we wanted to evaluate the risk factors associated with GDM and assess the maternal and fetal outcomes in pregnancy with gestational diabetes mellitus.

Methods: This is a prospective observational study conducted in the Department of Obstetrics and Gynaecology, Department of Endocrinology and Department of Paediatrics, MKCG Medical College, Berhampur from October 2019 to September 2021 among pregnant women of gestational age between 24-40 weeks who attended antenatal care in OPD and labor room and met inclusion criteria and diagnosed case of GDM in dept. of Obstetrics and Gynaecology, MKCG Medical College and Hospital.

Results: The incidence of caesarean deliveries (56.6%), pre-eclampsia (32%), PROM (7.3%) and PPH (6%) are higher among women with GDM. This indicates GDM can result a higher maternal mortality. 11.3% had preterm labor. Requirement of insulin treatment(n=27) is more as compared to MNT alone(n=13) in GDM associated with pre-eclampsia. GDM pregnancies had significantly higher frequency of LGA (30.8%) and mean average birth weight was 2889±587gm. Incidence of neonatal complications such as hyperbilirubinemia (12.6%) and respiratory distress (11.3%) had increased the chances of NICU (18%) admission.

Conclusion: A short-term intensive care gives a long term pay off in the primary prevention of obesity, impaired glucose tolerance and diabetes in the offspring as preventive medicine starts before birth.

Keywords: Pregnancy Outcomes in Gestational Diabetes Mellitus

Introduction

There are strong links between maternal malnourishment, offspring's birth weight and the child's consequent propensity to early insulin resistance [1]. This is particularly important in countries like India, were high levels of under nutrition

co-exist with rapid changes in young adulthood. Although several factors contribute to the epidemic of diabetes, intrauterine exposures are emerging as potential risk factors. Timely action taken in screening all pregnant women for glucose intolerance, achieving glycemic control in them and ensuring adequate nutrition may prevent, in all probability, the vicious cycle of transmitting glucose intolerance from one generation to another.

The most appropriate method of management would be tailored treatment program in which diet, oral anti-diabetics or insulin therapy are selected according to the needs of individual patient. Studies on post-partum glycemic scenario in India have shown that 10% of GDM women contribute to be diabetic, 40% have type 2 diabetes after 6 months and 2/3rd of GDM women have hyperglycemia within 4 years [2].

Aims and Objectives

- To evaluate the risk factors associated with GDM.
- To assess the maternal and fetal outcomes in pregnancy with gestational diabetes mellitus.

Materials and Methods

This is a prospective observational study conducted in the Department of Obstetrics and Gynaecology, Department of Endocrinology and Department of Paediatrics, MKCG Medical College, Berhampur from October 2019 to September 2021 among pregnant women of gestational age between 24-40 weeks who attended antenatal care in OPD and labor room and met inclusion criteria and diagnosed case of GDM in dept. of Obstetrics and Gynaecology, MKCG Medical College and Hospital. The study was approved by Indian Council of Medical Research (ICMR). All participants, including minors (less than 18 years) provided written consent after verbal explanation of the study protocol to every potential participant who met inclusion criteria.

Inclusion Criteria

Singleton hyperglycemic pregnant women detected for the first-time during pregnancy (according to DIPSI criteria) regardless of the presence or absence of risk factors.

Exclusion Criteria

Pregnancy with pregestational diabetes mellitus

Multiple pregnancy

Patient on diabetogenic drugs like corticosteroids, anticancer, ART, oral contraceptives, beta blockers, antipsychotics.

Patient with abnormal thyroid profile

Cushing syndrome

Chronic medical illness

Autoimmune disease

Study Procedure

All eligible women were interviewed using a structured checklist that includes sociodemographic characteristics, past and present obstetric history, maternal and fetal outcomes were recorded. At first antenatal visit, height and pre-pregnancy weight were taken for BMI. All study subjects will undergo screening test for GDM by DIPSI at gestational age 24-28 weeks and if negative then finally around 32-34 weeks.

All the screen positive mother were followed and treated with MNT and /or insulin according to the hospital protocol. All maternal and neonatal complication was recorded as per designed proforma. Maternal and neonatal complications given below were recorded.

All newborn's complications like gestational age at birth, newborn's anthropometry, APGAR score at birth and after 5 minutes to determine respiratory distress, birth trauma, neonatal hypoglycemia, congenital malformations,

admission to intensive care and stillbirth, neonatal jaundice were noted.

Statistical Analyses

Analysis was done using IBM SPSS STATISTICS (version 22.0). Discrete categorical data were presented as n%. Continuous data were written as either in the form of its mean and standard deviation or in the form of its median and interquartile range, as per the requirement. The Normality of quantitative data were checked by measures of Kolmogoro-Smirov tests of Normality; for Normality distributed data, t-test is carried out for 2 groups. For skewed data, Mann-Whitney U-test was used for statistical analysis of 2 groups. For categorical data, comparisons were made by Pearson Chi-square test or Fischer's exact test as appropriate (%). Receiver operating characteristics (ROC) curves were calculated to find maximum cut-offs values of active phase of labor for normal delivery. The ROC curve is a plot of sensitivity versus 1- specificity for maximal cut-offs. Proportions were compared on their applicability. All the statistical tests were two sided and performed at a significance level of α=0.05. Weight age of every risk's factor was done by odds' ratio.

Results

In this study, the maximum population of GDM patients came under the age group 31-35yrs (32.66%). The elderly gravidas covered 18.66%.

In this study shows that out of 150 GDM cases 55 women went to primary school, 44 to secondary, 32 had higher studies. While rest were with minimal studies.

The gravidity status of pregnant women in this study revealed that out of 150 GDM patients 41.33% were primi vs 58.66% were multigravida where as in non-GDM patients 65.33% were primi vs 34.66% were multi.

In this study, maximum occurrence of GDM was between 32-34weeks of gestation (52%) followed by 24-28weeks (34%), >34weeks (8%). Only 6% of study population were diagnosed with GDM at gestational age less than 24weeks.

The BMI of the pregnant women calculated using their pre-pregnancy weight revealed that 68(45.33%) of GDM women were in the overweight while 51(34%) were in obese. 31(20.66%) cases had normal pre-pregnancy weight.

An analysis of the weight gain in the early trimesters (up to 24 weeks) was done, and the results shows that 45.7% reported a weight gain of six-seven kilogram during early pregnancy. At the same time excessive weight gain in pregnancy (>7 kg) was found to be 48.6%.

The mean weight gain of the women during pregnancy revealed that there was less than 10kg weight increase during the gestational period for 70.6% and 53.33% in the GDM and non-GDM group respectively. Only 2% of the GDM and 18%of non-GDM women had more than 12 kg of weight gain during the gestational period.

Maternal Complications

Table 1. Maternal Complications

Complication		GDM	NON-GDM	P value
Pre-Eclampsia	Absent	110(68%)	136(90.67%)	0.001
	Mild	23(20.7%)	11(7.3%)	0.05
	Severe	17(11.3%)	3(0.06%)	0.01
UTI		29(19.3%)	13(8.67%)	0.1
Vaginal Candidiasis		32(21.33%)	19(12.67%)	0.01
Polyhydraminos		38(25.33%)	2(1.3%)	0.001
Oligohydraminos		6(4.0%)	8(5.33%)	0.5

Prolonged LABOR		26(17.33%)	13(8.33%)	0,05
Obstructed Labor		11(7.33%)	7(4.66%)	0.5
IUGR		4(2.67%)	9(6.0%)	0.1
PROM		31(20.66%)	13(8.67%)	0.01
Injury to Mother	Episiotomy	48(73.8%)	78(83.87%)	0.001
	1^{ST} & 2^{ND} Degree Perineal Tear	42(87.50%)	73(93.58%)	
	3^{RD} & 4^{TH} Degree Perineal Tear	3(4.6%)	2(2.56%)	
PPH		16(10.67%)	7(4.66%)	0.05
Shoulder Dystocia		2(1.3%)	0.00	0.05

In present study, out of 150 GDM vs non-GDM women 32% vs 7.36% women had pre-eclampsia among them 20.7% vs 7.3% women had mild pre-eclampsia and 11.3% vs 0.06% women had severe pre-eclampsia. 29 out of 150 GDM (19.3%) vs 13(8.67%) of non- GDM women had urinary tract infection and 32(21.33%) VS 19(12.67%) women infected with vaginal candidiasis. In present study there were 38(25.33%) in GDM VS 2(1.3%) in non- GDM women with polyhydramnios and 6(4.0%) among GDM and 8(5.33%) among non-GDM with oligohydramnios. 26(17.33%) among GDM vs 13(8.33%) among non-GDM women progressed to prolonged labor and 11(7.33%) among GDM and 7(4.66%) among non-GDM women to obstructed labor. Comparing injury to mother, episiotomy was given in 48(76%) women out of 65 women delivering vaginal delivery. PPH, seen in 16(10.67%) women. Shoulder dystocia seen in 2(1.3%) women.

Treatment Plan

In this study, maximum GDM women achieved their glycemic control with MNT plan alone (59.3%) and 34.6% achieved through insulin. only 6% of women were tried with oral hypoglycemic agent.

In our study, it has been seen that as severity of pre-eclampsia increases, requirement for insulin also increases. In severe pre-eclampsia, out of 17, 13 required insulin therapy where as in mild pre-eclampsia, 14 out of 23, their glycemic control with MNT alone.

Delivery Outcome

Table 2. Delivery Outcome

Mode		**GDM**	**NON-GDM**	**P Value**
Abortions		17(11.3%)	6(4.0%)	0.001
Spontaneous		65(43.33%)	74(49.33%)	0.5
Induced Labor		16(10.67%)	26(17.33%)	0.5
Labor Naturalis		34(22.67%)	93(62%)	0.001
Instrumental	Ventose	12(8%)	7(4.67%)	0.5
	Forceps	2(1.3%)	1(0.06%)	0.5
Caesarean	Emergency	33(22%)	20(13.33%)	0.1
	Elective	52(34.67%)	24(16.0%)	0.001

Rate of different modes of delivery in present study included vaginal deliveries were 34 among GDM mothers (22.67%) VS 93(62%) among non-GDM and caesarean deliveries were 85 mothers (56%) among GDM vs 44(19.33%) among non-GDM. Operative vaginal deliveries including instrumental delivery like application of ventose and forceps were seen in 8% vs 4.67% and 1.3% vs 0.06% respectively. Rate of caesarean was high, most of them were elective.

Post Partum Complications

Table 3. Analysis of Post Partum Complications

Post Partum Complication	GDM	NON-GDM	P Value
No. of Patients Requiring Blood Transfusion	7(4.66%)	4(2.66%)	0.5
Wound Infection	28(18.66%)	10(6.67%)	0.01
Wound Dehiscence	13(8.67%)	4(2.67%)	0.001
UTI	29(19.33%)	7(4.67%)	0.001
ICU/HDU Admission	41(27.33%)	4(2.66%)	0.001
Lactation Failure	40(26.67%)	23(15.33%)	0.05

Postpartum complications are more in number as patients requiring blood transfusion 4.66% vs 2.66%, wound infection 18.66% vs 6.67%, wound dehiscence 8.67 vs 2.67%, UTI 19.33% vs 4.67%, ICU/HDU admission 27.33% vs 2.66%, lactation failure 26.67% vs 15.33%.

Requirement of Insulin Following Delivery

There is sudden drop of insulin requirement following delivery, 7 out of 89 required insulin who were on MNT therapy, 29 out of 52 required insulin who were on insulin therapy.

Mode of Delivery & Treatment

Table 4. Association of Treatment Modalities & Their Outcomes

Mode of Delivery	MNT Plan	Insulin Plan	Total
Normal	38	13	51
Instrumental	10	4	14
Emergency LSCS	16	17	33
Elective LSCS	18	34	52

It was observed that in the study population, the caesarean section rate was higher in those women who were on insulin when compared to those on MNT plan alone which was statistically significant(p=<0.02). Among the 51 women who delivered via vaginal delivery, 38 of them were MNT plan alone and 13 of them were on insulin.

Fetal Outcome

Table 5. Birth Weight in Relation to Gestation Age

Fetal Outcome	Frequency	Percentage
IUD	3	2%
Still Birth	1	0.6%
Live Birth	139	92.6%
Early Neonatal Death	7	4.6%
	150	100%
Fetal Outcome		
Birth Weight	**Frequency**	**Percentage**
<2.5KG	21	14%
2.5-3.5KG	86	57.3%
3.5-4KG	32	21.3%
>4KG	11	7.3%
Birth Weight of Babies Born of GDM Mothers		

	Frequency	Percentage
Small for Date (SFD)	19	13%
Adequate for Date (AFD)	82	56%
Large for Date (LFD)	45	30.8%
Birth weight in relation to gestational age		

Out of the 150 GDM pregnancies, 139 were live births (92.6%), intra uterine death seen in 2% (3). 1 were still birth and early neonatal death seen in 7.

Apgar Score

APGAR Score at 1min and 5mins was recorded for all babies with the help of a medical assistant based on 5 criteria. Among all live birth babies, 114 out of 146 APGAR score at 1 min was >7 and only 32 were <7. Upon resuscitation, only 10 babies had AGAR score at 5min was <7. Mean score was found to be 8.24±0.6.

Birth Weight

Most of the babies 86(57.3%) born to GDM mothers had birth weight ranging from 2.5-3.5 kg (86). 14% (21) of babies were low birth weight. Average weight was found to be 2889±587 gm. The highly significant positive association observed between GDM and birth weight of the neonate was a clear indication of the possibilities to have high risk babies to GDM mothers.

Birth Weight in Relation Gestation Age

The babies born adequate for gestational age were maximum 82 (56%). Large for gestation babies were 45 (30.8%). Small for gestation babies were 19 (13%).

Neonatal Complications

Table 6. Neonatal Complications

Complications	Frequency	Percentage
Neonatal Hypoglycemia	8	5.3%
Respiratory Distress	17	11.3%
NNJ Requiring Phototherapy	19	12.6%
NICU Admission	27	18%
Congenital Anomalies	7	4.6%
Neonatal Polycythemia	-	-
Neonatal Hypocalcemia	-	-

Analysis of the incidence of individual health complications, the incidence of neonatal jaundice was high (12.6%) followed by respiratory distress (11.3%). Hypoglycemia (5.3%) was observed. Congenital anomalies were present in 7 babies. Hypoglycemia and congenital anomalies are statistically significant for babies of GDM mothers. Admission of newborns in neonatal intensive care unit was reported to be 18% causes may be hyperbilirubinemia and respiratory distress. The incidence of phototherapy requirement for neonates of GDM mothers is higher. Chi square analysis showed a statistically significant positive association between NICU admission as well as requirement of phototherapy and incidence of GDM.

Post Partum Follow Up

In the postpartum follow up 150 GDM mothers the attrition rate was 12%. Out of remaining 132 women the OGTT performed at 6weeks postpartum and was found to be elevated in 26 (17.3%).

Discussion

Age Distribution of Study

In this study observed that majority (32.66%) patients belong to age 31-35 years. Although no age was exempted from

the incidence of GDM, the results show progressive increase in incidence of GDM with age, and it is more predominant in women of 30yrs and above. The lower incidence in the elderly in this study could be probably because the mothers would have established pre-gestational diabetes and therefore did not meet the inclusion criteria. Findings by Kouhkan et al. [3] in 2021 et al shows maternal age 31.33±5.41yrs associated with GDM. Zarger et al. 2004 [4] reported that GDM prevalence steadily increased with age from 1.7% in women below 25 years to 18% in women 35 years or older.

Education Levels among Patients

While rest were with minimal studies The illiteracy rate was 12.66 % in GDM and graduates constituted a higher percentage with 21.33% in GDM, the incidence of GDM in the present study seemed to be increasing with educational status. This may be because the process of acquiring higher education elevates the age of marriage and maternal age as well, which in turn predisposes GDM. Study from Northwest Ethiopia, 2020 [5], shows similar result that women with higher education are more associated with GDM.

BMI

The pre-pregnancy obesity is associated with an increased risk of developing GDM, when compared to normal weight women. In this study, 45.33% were overweight and 34% were obese. Findings from analysis from RAHMA, 2021 [6] study shows that 29.7% had normal pre-pregnancy weight, 33.3% were overweight and 34.85 were obese. The risk of developing GDM was found to increase by 4% with each additional unit of pre-pregnancy BMI, compared to risk of normal weight women.

In this study it was observed that macrosomia baby is more delivered by obese mother as compared to normal weight mother. A study from South Arabia [6] observed that the mean birth weight was highest in infants in the obese GDM group (36.2%) and concluded that maternal obesity may be associated with higher birth weight and a greater risk of macrosomia and caesarean delivery than non-obese GDM.

Weight Gain in Early Pregnancy

Around 48.6% of cases there were high rates of gestational weight gain (>7Kg), especially early in pregnancy may increase a women risk of GDM was observed in the study. The mean weight gain of the women during pregnancy revealed that there was less than 10 kg weight increase during the gestational period for 70.6% and 53.33% in the GDM and non-GDM group respectively. Only 2% of the GDM and 18%of non-GDM women had more than 12 kg of weight gain during the gestational period. It was observed that early trimester gestational weight gain may need more clinical attention, as it has been identified as an independent and significant risk factor for GDM including pre-conception obesity.

As demonstrated by Lapolla et al. (2010) [7] excessive weight gain during first trimester increased the morbidity of GDM. Xi Lan et al. 2020 [8] concluded that excessive GWG in the first trimester, rather than the second trimester, is associated with increased risk of GDM regardless of pre-pregnancy BMI.

Gestational Age at Diagnosis

In present study, greater number of patients were diagnosed as early as 24-28weeks of gestation, but the increase in incidence of GDM cases is also seen during 32-34weeks of gestation which can be attributed to fact that insulin resistance was maximum during the last 3 months of pregnancy that was also observed in previous study (Peraldi et al). A study conducted by Stefanie [9] where FBS, HbA1C were done in 1st trimester of pregnancy to predict GDM in low-risk population. The author concluded that it was essential to diagnose GDM during early pregnancy to minimize the risks like maternal morbidity and neonatal morbidity and mortality.

Parity

In present study showed that more than half (58%) of these patients were multigravida. Sathiamma [10] observed 32.08% were primi and 67.92% were multi gravid. Wahabi et al. reported that the mean parity was found 3.19±2.46. Mac Neil et al. 2001 [11] reported that the recurrence of GDM is more common in the index pregnancy when variables like parity ≥1 and BMI ≥30 were present. The increased prevalence may be because of undiagnosed glucose intolerance in previous pregnancies and detected in index pregnancy.

Risk Factors

Obesity (34%) and family history of diabetes (38.6%) were the common risk factors observed in pregnant mothers, comparing among other risk factors was observed in this study. A study by Nilofer et al [12], where 150 high risk pregnant mothers with risk factors were recruited, among all the risk factors: family h/o diabetes, past h/o gestational diabetes, age>25 and obesity had a high sensitivity and negative predictive value. A retrospective cohort study by Weijiai Xu et al, 2021[13] observed that pre-pregnancy BMI, gestational weight gain, fasting blood glucose, triglyceride, and HDL in early pregnancy are the risk factors for the development of GDM, while interpregnancy interval, macrosomia during index pregnancy and a history of preterm birth are risk factor for the recurrence of GDM. Previous history of GDM was noticed in 7.3% cases in present study. In a systemic reviewed, the pooled GDM recurrence rate was found to be 48%.

Maternal Complications

In this study, 32% of GDM mothers had associated pre-eclampsia complicating GDM pregnancy. Ameya R et al [14] studied the feto-maternal outcomes in GDM and found that pre-eclampsia complicating pregnancy was found 26% of GDM mothers. A study from Northwest Ethiopia [5], 2020 observed women with GDM were 3 times at higher risk for PIH compared to their counterparts. The association might be due to the nature of co-exiting mutual risk factors such as obesity, advanced maternal age and family history of diabetes and hypertension.

Most of the UTI was seen in late half of 1st trimester and the 2nd trimester. Women with UTI had three times more risk of delivering preterm than those without UTI. In our study observed that incidence of UTI is 9.3%. A study done in Bangladesh [15], 2021 observed 2.8%.

The increased incidence (20%) of vaginal candidiasis in women with gestational diabetes observed in this study would be explained by the increased spill of sugar in urine and low socioeconomic status, thus contaminating the genitalia leading to fungal infection. Secondly, diabetic state is generally associated with reduced immunity, encouraging opportunistic infections to become prevalent. In a study from Mustary et al [16] found15%.

In our study observed that majority (85.4%) patients were term and 11.3% were preterm of the gestational age. Mustary et al [16]., reported the mean gestational age was found 36.58±2.34 weeks. In a study of Ethiopia [5] 2019, the extent of the preterm delivery (17.6%) was greater. The variation might be due to the difference in awareness and quality of health services. Most of them had associated complications of polyhydramnios and urinary tract infection, indicating that these could be the causative factors for the preterm labor.

This study identified that mothers with GDM had more risks for PROM (7.3%) this might be due to secondary complications of polyhydramnios and macrosomia babies caused by GDM.

Other maternal complications include prolonged labor (10%), obstructed labor (2.6%), PPH (6%), perineal tear (26.1%), shoulder dystocia (1.3%) are seen in more among GDM. This might due to

complications of GDM such as fetal macrosomia.

Mustray et al [16], reported 30% UTI, 20% had preterm, 20% had pre-eclampsia, 12% had vulvovaginitis. In intrapartum maternal complications13% had cervical tear, 13% had perineal tear and 8.7% had shoulder dystocia. In postpartum maternal complications,15.4% had PPH. G.Thiruvikrama [17] et al. 2017 observed pre-eclampsia 9%,non-progress of labor 14%, PROM 6%, perineal tear 6%, shoulder dystocia 1%.

Mode of Delivery

In this study observed more than half (56%) of the patients were caesarean section and similar with found in Ethiopia [5] 57.8%. This might be due to the fear of complication of birth injury in vaginal delivery. The most indications are fetal distress (11%) followed by previous scar (8%). Instrumental delivery around 9.3%, higher than 4.7% in study of Delhi. This might be because instrumental delivery was related to macrosomia leading to instrumental assisted vaginal delivery.

Treatment Plan

In this study, maximum GDM women achieved their glycemic control with MNT plan alone (59.3%) and 34.6% achieved through insulin. It might have been possible due to lesser number of obese patients and lower insulin resistance in women. Women needed insulin treatment are mainly associated with maternal age, higher BMI, a higher rate of family history of diabetes. Akram 2020 [18], observed in his study found diet plan (815), insulin plan (10.5%), OHA (8.5%). Nihar [19] & co found similar finding diet plan (83.3%), insulin plan (10.6%), OHA (6%).

In our study, it has been seen that as severity of pre-eclampsia increases, requirement for insulin also increases. In severe pre-eclampsia, out of 17, 13 required insulin therapy whereas in mild pre-eclampsia, 14 out of 23, their glycemic control with MNT alone. This can be explained by the theory that insulin resistance also plays a role in pathogenesis of pre-eclampsia and the two conditions share common factors contributing to the pathogenesis.

Fetal Outcome

Out of the 150 GDM pregnancies, 139 were live births (92.6%), intrauterine death seen in 2% (3). Still birth seen in one and early neonatal death seen in 7. Still birth occurred in 2.6% fetus of the diabetic mothers was studied in Ethiopia [5]. This might be due to related poor glycemic control. In this study, mean birth weight was found to be 2889±587 gm. Similar finding was found by Kumar et al. [20], reported the mean birth weight was 2848±539.4gm. Slagjana Simenova et al. [21], observed that the mean birth weight was found 3220.4±784.9gm. This might be due to poor glucose predisposes to develop complications for the infant.

Although maximum babies born were adequate for gestation (82%), Large for gestation babies were 45 (30.8%) are significantly more associated with infants of GDM mothers. Small for gestation babies were 19 (13%) are mainly due to diabetic comorbidity. A Study by Friederike et al. [22] found GDM pregnancies had significantly higher frequency of pregnancy of LGA (12.8%vs7.6%) and SDA (8.7%vs6.1%).

Neonatal Complications

The incidence of neonatal jaundice was high (12.6%) followed by respiratory distress (11.3%). Hypoglycemia (5.3%) was observed. Congenital anomalies were seen in 7 babies. Hypoglycemia and congenital anomalies are statistically significant for babies of GDM mothers. Admission of newborns in neonatal intensive care unit was reported to be 18% causes may be hyperbilirubinemia and respiratory distress. The incidence of phototherapy requirement for neonates of GDM mothers may be due to the increased

incidence of neonatal jaundice. Chi square analysis showed a statistically significant positive association between NICU admission as well as requirement of phototherapy and incidence of GDM. Kumar et al. [20], reported neonatal complications, 20.6% cases were found in hypoglycemia, 2.9% hyperbilirubinemia, 4.7% respiratory distress syndrome and 4.7% congenital anomalies. Mustray et al. [16], observed 12.0% had hyperbilirubinemia, 8%had respiratory distress infection, 2% had congenital anomalies and 4% were fresh still birth.

Postpartum Follow Up

During the postpartum follow-up at 6 weeks, 17.3% of the women were glucose intolerant. Kjos et al [23] performed 75g OGTT 5-8 weeks after delivery in 246 women with GDM and found 19% had abnormal OGTT, out of which 10% had impaired glucose intolerance and 9% had T2DM. [24] 16.9% of the population were glucose intolerant in the study by Ameya et al. [14]. Insulin sensitivity in glucose tolerant non-obese women with previous GDM were compared with controls. It was found that even these women are characterized by metabolic profile if type 2 diabetes. Therefore, all women with previous history of GDM should have regular assessment of their glucose tolerance in their years after pregnancy.

Limitations

- The quality of study would have been better if the large number of patients with GDM were enrolled.
- Incidence and prevalence of study population couldn't be calculated.
- The study did not check into account the degree and compliance of lifestyle and calories management for control of blood sugar in GDM, which were also important for maternal and neonatal outcome.
- Only short-term neonatal outcomes were compared in the study due to time constraints.
- Attribution rate was 12%.

Conclusion

A short-term intensive care gives a long term pay off in the primary prevention of obesity, impaired glucose tolerance and diabetes in the offspring as preventive medicine starts before birth.

Further studies on the treatment, long term and intergenerational effect of GDM are suggested.

Bibliography

1. Tuomilento, J. A Paradigm shift is needed in the primary prevention of type 2 diabetes, John Wiley and Sons ltd, England, Ganz, M: 2005:153-65
2. Mohan, V., Sandeep, S. and Deepa, R., (2007). Epidemiology of type 2 diabetes: Indian scenario, Indian J. Med Research,125(30:217-30,
3. Azam Kouhkan, Laily Najafia, Mojtaba Malek, Hamid Reza Baradaran, Roya Hosseini, Alirez Khajavi, Gestational diabetes mellitus:major risk factors and pregnancy related outcomes : A cohort study. International Journal of Reproductive Biomedicine 19(9), 827, 2021.
4. Zargar, A.H., Sheikh, M.I. and Bashir, M. (2004). Prevalence of gestational diabetes mellitus in Kashmiri women from the Indian subcontinent. Diabetes Resclin pract., 66(2):13945.
5. Abayneh, Chekol, Birth weight for Gestational Age and Associated factors Among Neonates Born Atpublic Health Facilities in Bahir Dar City, Northwest Ethiopia -2021-ir.bdu.edu.et.
6. H Wahabi, S Esmaeil, A Fayed – BioMed research international, 2021-maternal prepregnancy weight and pregnancy outcomes in Saudi women: subgroup analysis from Riyadh Mother and Baby Cohort study (RAHMA).
7. Lapolla, A., Dalfra, M.G., Fedele, D. Management of Gestational Diabetes Mellitus. Diabetes Metab Syndr Obes, 2009:2, 73-82.

8. Lan, X., Zhang, Y., Dong, H., Zhang, J., Zhou, F, Y., Zeng. G.2020. Excessive gestational weight gain in the first trimester is associated with risk of gestational diabetes mellitus: A prospective study from Southwest China. Public Health Nutrition.
9. Stefanie N. Hinkle, Michael Y. Tsai, and Culin Zhang. HbA1c measured in the first trimester of pregnancy and the association with gestational diabetes. Sci Rep. 2018; 8: 12249.
10. Sathiamma P.K., Lalithambica Karunakaram, A prospective study on maternal and perinatal outcome of gestational diabetes mellitus. Sathiamma PK et al. Int J Reprod Contracept Obstet Gynecol. 2017 Jul6(7):2933-2938.
11. MacNeil,S., Dodds, L. and Hamilton. (2001). Rates and risk factors for recurrence of gestational diabetes, Diabetes Care :24: 659-62.
12. Angadi Rajasab Nilofer, V.S. Raju, B.R. Dakshayini and Syed Ahmed Zaki, screening in high-risk group of gestational mellitus with its maternal and fetal outcomes, Indian J Endocrinol Metab. 2012 Mar, 16 (Suppl):S74-78.
13. Weijjao XU, Xia Xu, Yanni Guo et al. Effects of Risk factors for pregnancy outcomes of subsequent pregnancy associated with gestational diabetes mellitus: A retrospective Cohort Study in China., 18 Oct 2021. https://doi.org/10.21203/rs.3.rs-962585/v1.
14. Ameya R Dudhwadhkar, Michelle N Fonseca. Maternal and fetal outcome in gestational diabetes mellitus. Indian Journal of Reproduction and Contraception 2016. Oct5(10)3317-3321.
15. Sultana, N., Shermin,S., Jerin, & Jahan, S. Overview of obstetric patients and their outcome in a tertiary hospital of Bangladesh BIRDEM Medical Journal, 2021:12(1)41-44.
16. Mustary, F., Chowdhury, T.A., Begum,F., & Mahjabeen, N. 2019 . maternal and perinatal outcome in gestational diabetes melitus compared to pregestational Diabetes Mellitus. BIRDEM Medical Journal. 9(2).127-132.
17. Prakash GT, Das AK, Habeebullah S, Bhat V, Shamana SB. Maternal and neonatal outcome in Mothers with Gestational Diabetes Mellitus. Indian J Endocrinol Metab. 2017 Nov-Dec, 21(6): 854-858.
18. Akram Sobia Feto-maternal outcome among women with GDM belongs to low socioeconomic status. International Journal Health and Clinical Research,2020,3(6):230-234.
19. Dr. Nabnita Patnaik, dr. Nihar Ranjan Pradhan. Maternal and perinatal outcome in gestational diabetes among low socioeconomic status. Int J Clin Obstet Gynaecol 2020;4(3):35-38.
20. Kumari, R., Dalal, V., Kachhawa, G., Sahoo, I., Khadgawat, R., Mahey, R., & Kriplani, A. Maternal and perinatal outcome in gestational diabetes mellitus in a tertiary care hospital in Delhi. Indian journal of endocrinology and metabolism, 2018:22(1),116-120.
21. Simeonva-Krstevska, S., Velkoska Nakova, V., Samardziski,I., Atanasova Bosku, A., Todorovska I., Sima, A., & Milkovski, D. Perinatal outcome in gestational Diabetes Mellitus Vs Normoglycemic Women. Biomedical Journal of Scientific & Technical Research (BJSTR), 2020:26(2), 19882-19888.
22. Weschenfelder, F., Hein, F., Lehmann, T., Schleußner, E., Groten, T. contributing factors to perinatal outcome in Pregnancies with Gestational Diabetes- What Matters Most? A Retrospective Analysis. J. Clin. Med. 2021,10,348.
23. Kjos SL, Peter RK. Predicting future diabetes in women with gestational diabetes; utility of early postpartum glucose tolerance testing. Diabetes 44:586-91.

24. alafifi, mahmoud, Kbirou, A., Larrache, Y., Moataz, A., Dakir, M., Debbagh, A., Aboutaib, R., Sayah, M., Alafifi, R., Zamd, M., Mtioui, N., Elkhayat, S., Medkouri, G., Ramdani, B., & Benghane, M. Epidemiological and clinical profile of urinary tract infections in patients with percutaneous nephrostomy tubes, about 117 cases. Journal of Medical Research and Health Sciences, 2022:5(5), 1980–1985.