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Original Research Article

Impact of gestational weight gain in diabetic mothers on maternal and fetal outcomes at delivery

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ABSTRACT

Background: Adequate weight gain during pregnancy is crucial for healthy outcomes, while excessive weight gain is linked to adverse effects, including higher rates of cesarean sections, gestational diabetes, and complications during delivery. The aim of this study was to assess the impact of gestational weight gain on maternal and fetal outcomes in women with pregestational and gestational diabetes at delivery.
Methods: A cross-sectional study was conducted in the obstetrics and gynecology department of BIRDEM General Hospital-II, Dhaka during January 2023-June 2024. A total 102 pregnant women with pregestational diabetes and gestational diabetes mellitus (GDM) were consecutively selected from patients admitted after 37 weeks of gestation and divided in to GDM (n=51) and PGDM (n=51) groups.
Results: Among GDM patients, 49.0% had normal GWG, 31.4% excessive, and 19.6% inadequate, while in PGDM patients, 37.3% had normal, 37.3% inadequate, and 25.5% excessive GWG. Maternal complications occurred in 43.8% of GDM and 61.5% of PGDM mothers, with no significant difference. Fetal complications were comparable across GWG groups. Notably, newborns of PGDM mothers with normal GWG had higher rates of SGA and NICU admission compared to GDM, whereas normal birth weight was more common in GDM (p=0.014).
Conclusions: In GDM patients, excessive weight gain was linked to significantly higher cesarean section rates and while PGDM cases showed more fetal and maternal complications than GDM but not significant. However, most newborns had normal birth weights across all groups, and many outcomes did not differ significantly.

Keywords: Fetal outcomes, Gestational diabetes mellitus, Gestational weight gain, Maternal outcomes, Pregestational diabetes

INTRODUCTION

Diabetes mellitus increases the dangers that pregnant women with the disease have for both maternal and neonatal complications compared to those without the condition. Gestational diabetes mellitus (GDM) was 12.4% common in Irish women, according to data from the ATLANTIC Diabetes in Pregnancy (DIP) program, which used the International Association of Diabetes and Pregnancy Study Groups (IADPSG) criteria to implement

universal screening. Pregnancies complicated by GDM in this group showed noticeably greater percentages of unfavorable outcomes.[1]

Diabetes mellitus is a prevalent medical condition that often complicates pregnancy, with 20% of affected individuals having pregestational diabetes.[2] Fetuses and infants may experience developmental delays due to glucose intolerance and metabolic disorders associated with hyperglycemia. The idea that poorly controlled diabetes mellitus, especially hyperglycemia in the early stages of pregnancy, significantly increases the risk of serious congenital abnormalities and unfavorable pregnancy outcomes has received support from a number of epidemiological research.[3] Preterm births and stillbirths have decreased as a result of better diabetes management during pregnancy, but the prevalence of severe congenital abnormalities has not altered. Consequently, congenital anomalies- which account for 40-50% of all cases- have emerged as the primary cause of perinatal death among infants of diabetic mothers. It has been reported that the incidence of congenital abnormalities during pregnancies in women with pregestational insulin-dependent diabetes mellitus is two to five times higher than that of pregnancies that are not complicated. Malformations are detected in 2.7-16.8% of babies born to diabetes moms, more than double the background rate of 2-3%. Additionally, it has been proposed that glycated hemoglobin (HbA1C) may be a threshold that must be exceeded before a woman with pregestational diabetes is at increased risk for fetal abnormalities.[2]

China has experienced a remarkable increase in diabetes rates. Based on a 2013 national survey, it was found that around 11% of adults in China had diabetes, with nearly 36% exhibiting prediabetic conditions. A hallmark of gestational diabetes mellitus (GDM) is the development of or initial identification of glucose intolerance during pregnancy.[4] Pregnant women with a history of type 1 or type 2 diabetes mellitus, also known as pregestational diabetes mellitus (PGDM), had an increased risk of poor outcomes for both the mother and the newborn, according to the ATLANTIC-DIP trial.[1]

Recent studies indicate a global surge in gestational diabetes (GDM) and obesity rates, coinciding with an increase in overweight and obese women becoming pregnant. GDM affects 14.8% of pregnancies in mainland China; significant increases are associated with characteristics such as maternal age, maternal overweight/obesity, and maternal family history of diabetes mellitus. Obesity and GDM have been identified as the main risk factors in numerous studies, and pregnant women with GDM are more likely to experience unfavourable pregnancy outcomes.[5] Additionally, high pre-pregnancy BMI or excessive gestational weight gain increase the dangers to the newborn and the mother.[4]

Significant dangers to the mother and the unborn child arise when a mother has diabetes mellitus (DM) during pregnancy.[6] Expectant mothers with DM are at heightened risk of conditions like pre-eclampsia and cesarian delivery, while their infants are more prone to issues such as macrosomia and shoulder dystocia.[7] Maternal body mass index (BMI) increases are strongly correlated with the onset of gestational diabetes mellitus.[8] For example, research from the nurse's health study demonstrated that a pre-pregnancy BMI of 30 kg/m^2 or higher significantly increased the possible danger of developing gestational DM. Furthermore, it has been determined that pre-eclampsia, cesarean section, premature delivery, fetal macrosomia, and fetal death are significantly influenced by maternal obesity and excessive weight gain.[3]

The objective of this study was to assess the impact of gestational weight gain in diabetic mothers on both maternal and fetal outcomes at delivery.

METHODS

This cross-sectional analytical study was conducted in the department of obstetrics and gynecology, BIRDEM General Hospital, Dhaka, under the Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM) from August 2022 to June 2024. The study population consisted of pregnant women with either pregestational diabetes or gestational diabetes mellitus (GDM) admitted for delivery after 37 completed weeks of gestation. A total of 102 patients were recruited, including 51 with pregestational diabetes and 51 with GDM. Inclusion criteria were singleton pregnancy with pregestational diabetes or GDM, delivery after 37 weeks, and availability of a registered diabetic book and antenatal card with documentation from the first antenatal visit before 12 weeks of gestation. Exclusion criteria included pregnancies complicated by significant co-morbidities such as renal failure, sepsis, hypertension, or hypothyroidism.

The dependent variables were maternal outcomes including preeclampsia, gestational hypertension, postpartum hemorrhage (PPH), and premature rupture of membranes (PROM), and fetal outcomes including birth weight, congenital anomalies, neonatal hypoglycemia, respiratory distress, intrauterine fetal death, and NICU admission. The independent variables were gestational weight gain (GWG) and diabetes type, while demographic variables included age, socioeconomic status, and educational status. GWG was defined as the amount of weight gained between conception and delivery and was categorized according to the Institute of Medicine (IOM, 2009) guidelines based on pre-pregnancy BMI. BMI was calculated as weight in kilograms divided by height in meters squared and classified according to WHO criteria. Operational definitions were followed for macrosomia, PROM, PPH, neonatal hypoglycemia, and socioeconomic status.

Eligible participants were consecutively enrolled after approval from the institutional review board. Participants

were categorized into three GWG groups: excessive, adequate, and inadequate. Data sources included patient interviews, observation, clinical examination, antenatal cards, and hospital records. A semi-structured questionnaire was used to collect demographic, clinical, obstetric, and neonatal data, and each participant had an individual data sheet. Data were analyzed using SPSS version 26.0. Descriptive statistics were applied, and associations between GWG and maternal and fetal outcomes were assessed using Chi-square or Fisher's exact test, with $p<0.05$ considered statistically significant. Written informed consent was obtained from all participants, and confidentiality was strictly maintained.

RESULTS

Figure 1 shows the distribution of gestational weight gain (GWG) types among participants with gestational diabetes mellitus (GDM). It indicates that 49.02% of the participants had normal weight gain (red segment, 25 participants), 31.37% had excessive weight gain (blue segment, 16 participants), and 19.61% had inadequate weight gain (green segment, 10 participants). Normal weight gain was the most common, while inadequate weight gain was the least common.

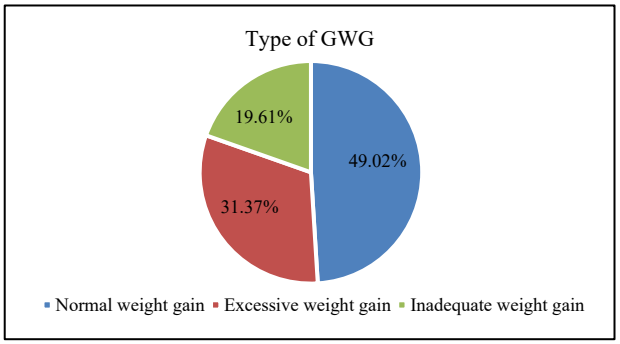

Figure 1: Pie chart of Type of gestational weight gain among GDM patients.

Table 1: Categorization of GDM patient according to sociodemographic characteristic by groups.

Sociodemographic parameters	Excessive weight gain (n=16) N (%)	Normal weight gain (n=25) N (%)	Inadequate weight gain (n=10) N (%)	P value
Age in years (Mean±SD)	27.7±3.4	27.5±3.6	28.4±5.1	0.840[a]
Education				
Primary	0 (0.0)	3 (12.0)	0 (0.0)	
SSC	3 (18.8)	3 (12.0)	1 (10.0)	0.644[b]
HSC and above	13 (81.2)	19 (76.0)	9 (90.0)	
Occupation				
Housewife	8 (50.0)	18 (72.0)	8 (80.0)	
Service holder	8 (50.0)	6 (24.0)	1 (10.0)	0.126[b]
Student	0 (0.0)	1 (4.0)	1 (10.0)	
Socioeconomic status				
Poor	1 (6.2)	2 (8.0)	0 (0.0)	
Middle class	11 (68.8)	15 (60.0)	7 (70.0)	0.981[b]
Rich	4 (25.0)	8 (32.0)	3 (30.0)	

[b]Fisher's exact test, [a]ANOVA test. Group I= excessive weight gain, group II= normal weight gain, group III= inadequate weight gain

Table 2: Categorization of GDM patient according to blood glucose control by groups.

Control of blood glucose by-	Excessive weight gain (n=16) N (%)	Normal weight gain (n=25) N (%)	Inadequate weight gain (n=10) N (%)	P value
Diet	10 (62.5)	13 (52.0)	8 (80.0)	0.341[b]
Insulin	6 (37.5)	12 (48.0)	2 (20.0)	

[b]Fisher's exact test.

Among patients with GDM, the mean age was similar across the groups with excessive, normal, and inadequate weight gain. In the excessive weight gain group, 81.2% had passed HSC and 18.8% had completed SSC. In the normal weight gain group, 76.0% had passed HSC, 12.0% had completed SSC, and 12.0% had primary education. In the inadequate weight gain group, 90.0% had passed HSC and 10.0% had completed SSC (Table 1).

In the excessive weight gain group, 62.5% controlled blood glucose with diet and 37.5% with insulin. In the normal weight gain group, control was evenly split between diet (52.0%) and insulin (48.0%). In the inadequate weight gain group, 80.0% used diet and 20.0% used insulin. All these findings were statistically non-significant (p=0.341) (Table 2).

Table 3: Categorization of GDM patient according to type of maternal outcomes by groups.

Type of maternal complication	Excessive weight gain N (%)	Normal weight gain N (%)	Inadequate weight gain N (%)	P value
Maternal complication				
Present	7 (43.8)	4 (16.0)	3 (30.0)	0.116[b]
Absent	9 (56.2)	21 (84.0)	7 (70.0)	
PROM	3 (42.8)	2 (50.0)	2 (66.7)	1.000[b]
PPH	0 (0.0)	0 (0.0)	0 (0.0)	
Preeclampsia	1 (14.3)	0 (0.0)	0 (0.0)	
Gestational HTN	3 (42.9)	2 (50.0)	1 (33.3)	

[b]Fisher's exact test.

Table 4: Categorization of GDM patient according to fetal outcomes by groups.

Fetal complication	Excessive weight gain (n=16) N (%)	Normal weight gain (n=25) N (%)	Inadequate weight gain (n=10) N (%)	P value
Present	10 (62.5)	9 (48.0)	6 (60.0)	0.327[b]
Absent	6 (37.5)	16 (52.0)	4 (40.0)	

[b]Fisher's exact test.

Table 5: Categorization of pregestational DM patient according to blood glucose control by groups.

Control of blood glucose by-	Excessive weight gain (n=13) N (%)	Normal weight gain (n=19) N (%)	Inadequate weight gain (n=19) N (%)	P value
Diet	1 (7.7)	2 (10.5)	1 (5.3)	0.826[b]
Insulin	12 (92.3)	17 (89.5)	18 (94.7)	

[b]Fisher's exact test.

Table 6: Categorization of pregestational DM patient according to type of maternal complications by groups.

Type of maternal complication	Excessive weight gain (n=8) N (%)	Normal weight gain (n=5) N (%)	Inadequate weight gain (n=5) N (%)	P value
Maternal complication				
Present	8 (61.5)	5 (26.3)	5 (26.3)	0.522[b]
Absent	5 (38.5)	14 (73.7)	14 (73.7)	
PROM	4 (50.0)	3 (60.0)	2 (40.0)	0.753[b]
PPH	2 (25.0)	0 (0.0)	0 (0.0)	
Preeclampsia	1 (12.5)	0 (0.0)	1 (20.0)	
Gestational HTN	1 (12.5)	2 (40.0)	2 (40.0)	

[b]Fisher's exact test.

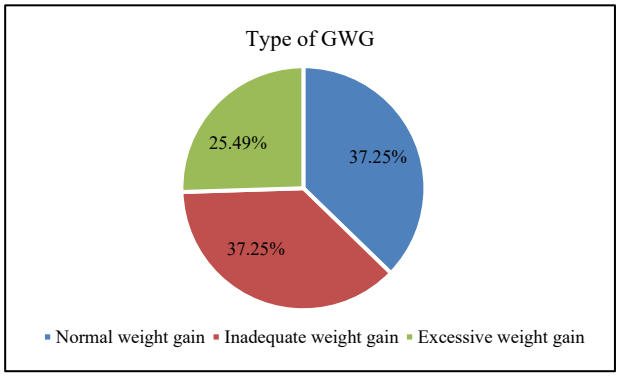

Figure 2: Type of gestational weight gain among PGDM patients.

Table 3 shows a non-significant finding of maternal complications in each weight gain group. In the excessive weight gain group, 43.8% had complications and 56.2% did not. In the normal weight gain group, 16.0% had complications and 84.0% did not. In the inadequate weight gain group, 30.0% had complications and 70.0% did not. The p value was 0.116. The table also details the types of maternal complications across different weight gain groups. In the excessive weight gain group, 42.8% experienced PROM, 42.9% had gestational hypertension (HTN) and only 14.3% had preeclampsia with no cases of PPH. In the normal weight gain group, 50.0% had gestational HTN, and 50.0% experienced PROM with no cases of preeclampsia or PPH. In the inadequate weight gain group, 66.7% had PROM and 33.3% had gestational

HTN, with no cases of preeclampsia or PPH. All these findings were statistically non-significant (p=1.000).

Table 4 shows that fetal complications were present in 62.5% of cases with excessive weight gain, 48.0% with normal weight gain, and 60.0% with inadequate weight gain, with no significant difference between groups (p=0.327).

Figure 2 shows the distribution of gestational weight gain among participants with pregestational diabetes mellitus, with 37.25% experiencing normal weight gain, 37.25% experiencing inadequate weight gain, and 25.49% experiencing excessive weight gain.

Table 5 indicates that blood glucose control was primarily managed by insulin for most women, with 92.3% in the excessive weight gain group, 89.5% in the normal weight gain group, and 94.7% in the inadequate weight gain group, showing no significant difference (p=0.826). Only a small percentage managed it through diet: 7.7% in the excessive weight gain group, 10.5% in the normal weight gain group, and 5.3% in the inadequate weight gain group.

Table 6 shows that maternal complications were present in 61.5% of women with excessive weight gain, 26.3% of women with normal weight gain, and 26.3% of women with inadequate weight gain, with no significant difference (p=0.522). Complications were absent in 38.5% of the excessive weight gain group, 73.7% of the normal weight gain group, and 73.7% of the inadequate weight gain group. The table also indicates that among women with excessive weight gain, 50.0% had premature rupture of membranes (PROM), 25.0% had postpartum hemorrhage (PPH), 12.5% experienced preeclampsia and 12.5% had gestational HTN. For those with normal weight gain, 60.0% had PROM, 40.0% experienced gestational hypertension and none had PPH or preeclampsia. In the inadequate weight gain group, 40.0% had gestational hypertension, 40.0% experienced PROM, 20.0% had preeclampsia and none had PPH. However, there were no statistically significant differences between the groups (p=0.753).

Table 7 shows that 43.8% of mothers with gestational diabetes mellitus (GDM) and 61.5% of mothers with pregestational diabetes mellitus (PGDM) experienced complications, with no significant difference between the two groups (p value =0.340).

Table 7: Categorization of excessive weight gain patient according to presence of maternal complications by groups (GDM=16 and PGDM=13).

Maternal complications	GDM N (%)	PGDM N (%)	P value
Present	7 (43.8)	8 (61.5)	0.340[c]
Absent	9 (56.2)	5 (38.5)	

[c]Chi square test.

Table 8: Categorization of normal weight gain patient according to type of fetal complications by groups (GDM=25 and PGDM=19).

Type of fetal complications	GDM (n=25) N (%)	PGDM (n=19) N (%)	P value
Birthweight of newborn			
SGA	1 (4.0)	7 (36.8)	0.014[b]
LGA	1 (4.0)	1 (5.3)	
Hypoglycemia	2 (8.0)	2 (10.5)	1.000[b]
RD	3 (12.0)	1 (5.3)	0.622[b]
NICU admission	5 (20.0)	6 (31.6)	0.380[a]
APGAR score in first 5 minutes			
<7	5 (20.0)	6 (31.6)	0.380[a]
≥7	20 (80.0)	13 (68.4)	

[b]Fisher's exact test.

Patients with normal weight gain were categorized according to the type of fetal complications into two groups: GDM and PGDM. Among the GDM group, 23 (92.0%) had newborns with normal birth weight, compared to 11 (57.9%) in the PGDM group, with a P value of 0.014. There was 1 case (4.0%) of SGA in the GDM group and 7 cases (36.8%) in the PGDM group. Both groups had 1 case of macrosomia each (4.0% for GDM and 5.3% for PGDM). The mean birth weight was 3.2±0.5 for the GDM group and 2.9±0.4 for the PGDM group, with a p value of 0.058. Hypoglycemia occurred in 2 cases (8.0%) in the GDM group and 2 cases (10.5%) in the PGDM group, with a p value of 1.000. RDS was seen in 3 cases (12.0%) in the GDM group and 1 case (5.3%) in the PGDM group, with a p value of 0.622. NICU admission was required for 5 newborns (20.0%) in the GDM group and 6 newborns (31.6%) in the PGDM group, with a p value of 0.380. An APGAR score of less than 7 in the first 5 minutes was recorded in 5 cases (20.0%) in the GDM group and 6 cases (31.6%) in the PGDM group, with a p value of 0.380. An APGAR score of 7 or higher was recorded in 20 cases (80.0%) in the GDM group and 13 cases (68.4%) in the PGDM group (Table 8).

DISCUSSION

In a normal pregnancy, weight gain is a common occurrence, though the amount can vary. This weight gain can influence the immediate and future health of both the mother and her infant. Therefore, a healthy pregnancy outcome depends on gaining the appropriate amount of weight during the pregnancy. The woman's pre-pregnancy BMI levels determine the appropriate weight gain.

The mean age of GDM patients was similar across the groups with excessive, normal, and inadequate weight gain. In the excessive weight gain group, 81.2% had completed HSC, SSC (18.8%) while the normal weight gain group had a mix of HSC (76.0%), SSC (12.0%), and primary education (12.0%). The inadequate weight gain group had 90.0% with HSC and 10.0% with SSC.

Professionally, half of the women in the group with severe weight gain were housewives, and the other half worked in service. In the normal weight gain group, 72.0% were housewives, 24.0% were in service jobs, and 4.0% were students. In the inadequate weight gain group, 80.0% were housewives, with 10.0% in service jobs and 10.0% students.

Numerous investigations have demonstrated that as people age, pregestational diabetes becomes more common. For instance, a study by Lawrence et al, found that older age is a significant risk factor for pregestational diabetes, comparable to our study's conclusions where pregestational diabetes was more common in women over 35 than gestational diabetes mellitus (GDM).[9] According to similar findings, women with higher education levels tend to be more proactive in managing their health and have better health literacy, which may result in a higher diagnosis rate of GDM during routine prenatal care.[10] This result is consistent with the study conducted by Ferrara et al, which found that socioeconomic status and occupation did not significantly predict the type of diabetes in expectant mothers. This suggests that diabetes is prevalent in a variety of occupational and socioeconomic contexts.[11]

Among GDM patients, in the excessive weight gain group, 62.5% managed their blood glucose through diet, while 37.5% used insulin. In the normal weight gain group, control was divided about equally between food (52.0%) and insulin (48.0%). In the inadequate weight gain group, 80.0% relied on diet, and 20.0% used insulin. P=0.341 indicates that these differences were not statistically significant. Insulin was the primary means of blood glucose management for the majority of women having PGDM: In the group with substantial weight gain, 92.3%, 89.5% in the normal weight gain group, and 94.7% in the inadequate weight gain group, with no significant difference (p=0.826). Only a small percentage managed it through diet: 7.7% in the excessive weight gain group, 10.5% in the normal weight gain group, and 5.3% in the inadequate weight gain group. This disparity likely arises because pregestational diabetes often requires more intensive management due to its longer duration and potential for more severe glucose dysregulation, necessitating the use of insulin more frequently compared to the typically milder and more recent onset of GDM, which can often be managed with dietary changes. This is consistent with research by Jovanovic et al which indicated that dietary modification is often sufficient for managing GDM in many cases due to its typically recent onset and milder glucose dysregulation.[12] A further study by Mulla et al, found that a greater proportion of GDM-afflicted women needed pharmaceutical intervention since fewer of them were able to control their condition with diet alone.[13] This difference may be due to varying population characteristics or differing criteria for initiating insulin therapy. Conversely, a study by Landon et al, reported a lower percentage of insulin use among women with pregestational diabetes, attributing the variance to advances in diabetes management and better overall control of the condition through newer oral hypoglycemic agents and lifestyle modifications.[14]

In present study, among GDM patients, there was a non-significant difference in maternal complications across the weight gain groups. In the excessive weight gain group, 43.8% experienced complications, while 56.2% did not. In the normal weight gain group, 16.0% had complications, and 84.0% did not. In the inadequate weight gain group, complications were reported in 30.0% of cases, with the same percentage being complication-free. The p value was 0.116%. Among PGDM patients, maternal complications were present in 61.5% of women with excessive weight gain, 26.3% of those with normal weight gain, and 26.3% of those with inadequate weight gain, with no significant difference (p=0.522). Complications were absent in 38.5% of the excessive weight gain group and in 73.7% of both the normal and inadequate weight gain groups. Among GDM patients, in the excessive weight gain group, 42.9% experienced premature rupture of membranes (PROM), 42.9% had gestational hypertension (HTN), and 14.3% had preeclampsia, with no cases of postpartum hemorrhage (PPH). In the normal weight gain group, 50.0% had gestational HTN and 50.0% experienced PROM, with no cases of preeclampsia or PPH. In the inadequate weight gain group, 66.7% experienced PROM, and 33.3% had gestational HTN, with no cases of preeclampsia or PPH. These findings were statistically non-significant (p=1.000). Among mothers with PGDM and excessive weight gain, those with GDM had higher rates of PROM (50.0%) and gestational hypertension (12.5%), while those with PGDM had higher rates of PROM (50.0%), postpartum hemorrhage (PPH) (25.0%), and preeclampsia (12.5%). These findings were also statistically non-significant (p=0.753). This is consistent with research by Hedderson et al that found increased insulin resistance linked to excessive weight gain during pregnancy increases the likelihood of developing GDM.[15] On the other hand, a study by Scifres et al, found that women who had gained weight normally had a reduced prevalence of GDM, suggesting that dietary and lifestyle variations among various groups may have an impact on glucose metabolism.[16] Similar results about insufficient weight growth were seen by Baci et al, who hypothesized that the difficulties in controlling diabetes throughout pregnancy may be the reason why insufficient weight gain is frequently linked to increased incidence of pregestational diabetes.[17] However, a study by Hannaford et al discovered that women who did not acquire enough weight had a reduced incidence of pregestational diabetes, suggesting that disparities in prenatal care and healthcare access may be important factors in these outcomes.[18] Another study suggested that GDM generally leads to fewer complications than pregestational diabetes, particularly when weight gain is within normal ranges.[19]

In present study, maternal complications showed no significant differences between GDM (43.8%) and PGDM (61.5%) groups across weight gain categories. In the excessive weight gain group, PGDM mothers had higher

rates of PROM and gestational hypertension, PPH while GDM mothers had more cases of PROM, GH, and preeclampsia. Fetal complications common in PGDM (92.5%) compared to GDM (62.5%). For normal weight gain, PGDM mothers experienced more fetal complications (57.9% versus 28.0% in GDM), with higher NICU admissions in PGDM (31.6% versus 20.0%). Inadequate weight gain showed no significant differences in maternal or fetal complications, though PGDM mothers had slightly higher rates of PROM and gestational hypertension, with 73.7% of PGDM cases having fetal complications compared to 60.0% in GDM. Overall, PGDM pregnancies generally had more complications, particularly in normal and inadequate weight gain groups, though these differences were often not statistically significant. This aligns with research by Hedderson et al which indicated that excessive maternal weight gain is linked to increased risks of adverse fetal outcomes, particularly in GDM cases, due to heightened maternal hyperglycemia.[15] Ray et al reported that, higher risk of obstetrical complications was associated with pregestational diabetes, compared to gestational diabetes, regardless of baseline weight and weight gain, may be due to several factors. One important explanation is that, in pregestational diabetes, fetal exposure to the hyperglycemic milieu is typically longer and more severe than in gestational diabetes, which is consistent with the current findings and may result in larger pathogenic effects.[3]

This study's outcome is in line with research from the American Diabetes Association, which found that independent of the mother's weight gain, pregestational diabetes is linked to a higher prevalence of fetal problems.[19] Insufficient weight gain did not significantly increase fetal problems for either group, according to a study by Macrì et al. This suggests that the metabolic status of the mother and her general health may be more important factors than weight gain alone.[20]

This study has some limitations. Weight gain during pregnancy is complex, affecting pregnancy outcomes and overall health, and influenced by physiological, psychological, environmental, behavioral, familial, and cultural factors. Result of the study may not represent the exact picture of the whole population.

CONCLUSION

Fetal complication like SGA was significantly higher in the excessive weight gain group of pregestational diabetic patients. Maternal complications like PROM and PPH were more common, with no significant difference among the three study groups. Cesarian delivery (CS) was significantly higher in the excessive weight gain group in gestational diabetic patients. Most of the newborns had normal birth weight, and there were no significant differences in the rates of hypoglycemia, respiratory distress (RD), or NICU admission among the groups.

Recommendations

To address the numerous variables impacting prenatal weight gain, a multidisciplinary approach involving obstetricians, endocrinologists, nutritionists, and mental health practitioners should be implemented. More extensive, controlled research is necessary to determine the best therapies and to acquire a better understanding of the association between gestational weight increase and pregnancy outcomes in moms with diabetes.

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