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ORIGINAL ARTICLE

Pregnancy Outcome in Women with and without Diabetes Mellitus – A Comparative Study

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ABSTRACT
Background: *Diabetes during pregnancy, both gestational and pre-existing, is an increasing concern in South Asia, linked to higher risks of preeclampsia, cesarean delivery, macrosomia, and neonatal hypoglycemia. This study compared maternal and neonatal outcomes between diabetic and non-diabetic pregnancies in a tertiary hospital.* ***Methods & Materials:*** *This comparative cross-sectional study was carried out in the Department of Gynecology and Obstetrics, Gazi Medical College Hospital, Khulna, Bangladesh, from January to December 2024. A total of 320 pregnant women (160 with diabetes and 160 without) were enrolled to compare maternal and neonatal outcomes. Participants were ≥28 weeks gestation with singleton pregnancies. Data on demographics, antenatal complications, delivery, and neonatal outcomes were collected using a structured questionnaire. Gestational diabetes was diagnosed per IADPSG/WHO 2013 criteria, and analyses were performed using SPSS v26.0.* ***Results:*** *Among 320 pregnant women, most diabetics had gestational diabetes diagnosed at 26 weeks, with 70% achieving good glycemic control. Diabetic mothers showed higher rates of polyhydramnios, caesarean delivery, macrosomia, and shoulder dystocia. Their infants had greater birthweight, more hypoglycaemia, NICU admissions, and longer hospital stays. Adverse maternal (21.3% vs. 11.3%) and neonatal (36.3% vs. 21.3%) outcomes were significantly higher in diabetics. Diabetes, maternal age ≥35 years, and hypertension independently predicted poor outcomes.* ***Conclusion:*** *This study found that diabetes during pregnancy, whether gestational or pre-existing, significantly increases the risk of adverse maternal and neonatal outcomes, including hypertension, cesarean delivery, macrosomia, and neonatal hypoglycemia. Even with reasonable glycemic control, complications remained more common among diabetic mothers than non-diabetic ones.*

Keywords: *Gestational Diabetes Mellitus (GDM), Pregnancy Complications, Maternal and Neonatal Outcomes*

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INTRODUCTION

Diabetes mellitus in pregnancy, encompassing both pre-existing diabetes and gestational diabetes mellitus (GDM), represents a growing global health challenge. Approximately 16–17% of pregnancies worldwide are affected by hyperglycemia in pregnancy, accounting for more than 21 million live births in 2013 [1]. The prevalence of GDM has risen sharply in recent decades, driven by global increases in obesity, sedentary lifestyles, and type 2 diabetes [2]. More than 90% of cases occur in low- and middle-income countries, emphasizing the disproportionate burden faced by these regions [1,3]. In South Asia, the prevalence of GDM is among the highest globally, ranging between 10% and 25% depending on diagnostic criteria [2,4]. South Asian women exhibit heightened genetic and metabolic susceptibility to GDM, often developing glucose intolerance at lower body mass indices than women of European descent [5]. In Bangladesh, a study found the overall prevalence of GDM was 35% [6]. The burden is significant; recent meta-analyses estimate the pooled prevalence of GDM at approximately 13% (95% CI: 7–21%) [7]. This increasing prevalence, coupled with limited healthcare resources, underscores the urgent need to address the maternal and neonatal consequences of diabetes in pregnancy. Global initiatives, such as the International Federation of Gynecology and Obstetrics (FIGO) 2015 guidelines, highlight GDM as a major contributor to adverse pregnancy outcomes and advocate for universal screening and context-specific management [8]. However, applying these recommendations in resource-constrained settings like Bangladesh requires local evidence on the impact of diabetes on pregnancy outcomes. GDM and pre-existing diabetes substantially increase maternal and perinatal morbidity and mortality. Maternal complications such as preeclampsia, gestational hypertension, polyhydramnios, and infections occur more frequently in diabetic pregnancies [9]. A meta-analysis of South Asian data found a strong association between GDM and hypertensive disorders of pregnancy and cesarean delivery [10]. Neonatal outcomes are similarly affected. Maternal hyperglycemia promotes fetal hyperinsulinemia, leading to macrosomia, birth trauma, and shoulder dystocia [11,12]. GDM has also been associated with low birth weight and preterm birth in some South Asian populations, reflecting variations in glycemic control and care access [10]. Moreover, diabetic pregnancies are linked with stillbirths, perinatal mortality, and higher neonatal intensive care unit (NICU) admissions [13]. Infants of diabetic mothers are at increased risk for hypoglycemia, respiratory distress, and jaundice due to metabolic maladaptation [14]. Poor glycemic control in early pregnancy increases the likelihood of congenital anomalies, particularly in women with pre-gestational diabetes [15]. Treatment and glycemic optimization significantly reduce complications. A meta-analysis demonstrated that management of even mild GDM lowered risks of macrosomia, shoulder dystocia, hypertensive disorders, and cesarean delivery [16]. However, residual neonatal risks persist, emphasizing the importance of close monitoring and postpartum follow-up [16]. Beyond pregnancy, women with GDM are seven to ten times more likely to develop type 2 diabetes later in life. At the same time, their offspring face increased risks of obesity and metabolic syndrome, perpetuating an intergenerational cycle of diabetes [17]. Thus, early identification and intervention during pregnancy have profound long-term implications for maternal and child health. Despite growing recognition of GDM as a public health issue, data from low-income countries, particularly Bangladesh, remain scarce. The 2021 regional review by Mistry et al. highlighted significant heterogeneity and data gaps in South Asian studies, including inconsistent definitions of GDM, varying diagnostic criteria, and incomplete outcome reporting [10]. Furthermore, local evidence comparing maternal and neonatal outcomes in diabetic versus non-diabetic pregnancies is inadequate. Given the rising prevalence of diabetes in pregnancy and the significant impact on maternal and neonatal outcomes, there is an urgent need for comprehensive comparative studies in Bangladesh. Quantifying differences in antenatal complications, intrapartum outcomes, and neonatal morbidity between diabetic and non-diabetic women can inform evidence-based interventions and resource planning. Therefore, the present retrospective study aimed to compare pregnancy outcomes in women with and without diabetes mellitus in a Bangladeshi tertiary care setting.

METHODS & MATERIALS

This comparative cross-sectional study was conducted in the Department of Gynecology and Obstetrics at Gazi Medical College Hospital, Khulna, Bangladesh, over one year from January to December 2024. The study aimed to compare pregnancy and neonatal outcomes between women with and without diabetes mellitus. A total of 320 pregnant women were included, comprising 160 diabetic (pre-gestational and gestational diabetes mellitus) and 160 non-diabetic participants, selected using a consecutive sampling technique and matched in a 1:1 ratio for age and parity. Inclusion criteria included singleton pregnancies beyond 28 weeks of gestation, while women with multiple pregnancies, chronic systemic diseases other than diabetes, or significant fetal anomalies were excluded. Gestational diabetes mellitus was diagnosed based on the IADPSG/WHO 2013 criteria using a 75 g oral glucose tolerance test [18,19], and pre-gestational diabetes was confirmed in women diagnosed before pregnancy or before 20 weeks of gestation. Data were collected prospectively using a structured questionnaire covering socio-demographic characteristics, antenatal history, obstetric complications, delivery outcomes, and neonatal status. Primary outcomes included mode of delivery and composite adverse maternal and neonatal outcomes, while secondary outcomes included birthweight, gestational age, and perinatal mortality.

Statistical analyses were performed using SPSS version 26.0, applying the t-test or Mann–Whitney U test for continuous variables and Chi-square or Fisher's exact test for categorical variables. Multivariable logistic regression was used to identify independent predictors of adverse outcomes, and a p-value <0.05 was considered statistically significant. Ethical approval was obtained from the Institutional Ethics Review Committee of Gazi Medical College Hospital, and written informed consent was secured from all participants prior to inclusion in the study.

RESULTS

The mean maternal age was similar across groups (29.1 ± 5.5 vs. 28.2 ± 5.1 years). Most participants were aged 20–29 years, resided in urban areas, and had secondary-level education. The median family income was significantly higher among diabetic mothers (BDT 35,000 [25,000–50,000]) compared to non-diabetic mothers (BDT 30,000 [22,000–45,000]; $p = 0.041$). Both groups had comparable parity and gravidity. However, the mean BMI was significantly greater among diabetic mothers (27.0 ± 4.2 kg/m^2) than non-diabetic ones (24.8 ± 3.9 kg/m^2; $p < 0.001$), with a higher proportion of overweight/obese women in the DM group ($p = 0.008$). Other variables, including residence, education, consanguinity, antenatal visits, tobacco exposure, chronic hypertension, and thyroid disease, showed no statistically significant differences between the two groups.

Table – I: Baseline maternal socio-demographic and obstetric characteristics of study participants (*n*=320)

Variable		Diabetes (DM) n=160	Non-DM n=160	P-value
Age (years), mean ± SD		29.1 ± 5.5	28.2 ± 5.1	
Age group, n (%)	<20	8 (5.0)	18 (11.3)	0.182
	20–29	80 (50.0)	92 (57.5)	
	30–34	44 (27.5)	34 (21.3)	
	≥35	28 (17.5)	16 (10.0)	
Residence, n (%)	Urban	112 (70.0)	96 (60.0)	0.067
	Rural	48 (30.0)	64 (40.0)	
Education, n (%)	No school	12 (7.5)	20 (12.5)	0.412
	Primary	44 (27.5)	52 (32.5)	
	Secondary	68 (42.5)	60 (37.5)	
	≥HSC	36 (22.5)	28 (17.5)	
Monthly family income (BDT), median [IQR]		35,000 [25,000–50,000]	30,000 [22,000–45,000]	0.041*
Parity, median [IQR]		1 [0–2]	1 [0–2]	0.719
Gravidity, median [IQR]		2 [1–3]	2 [1–3]	0.684
BMI (kg/m^2), mean ± SD		27.0 ± 4.2	24.8 ± 3.9	<0.001*
BMI category, n (%)	<18.5	6 (3.8)	12 (7.5)	0.008*
	18.5–22.9	42 (26.3)	68 (42.5)	
	23.0–27.4	64 (40.0)	54 (33.8)	
	≥27.5	48 (30.0)	26 (16.3)	
Consanguinity, n (%)		18 (11.3)	14 (8.8)	0.489
≥4 ANC visits, n (%)		124 (77.5)	118 (73.8)	0.445
Tobacco exposure in household, n (%)		36 (22.5)	40 (25.0)	0.621
Chronic hypertension, n (%)		22 (13.8)	12 (7.5)	0.081
Thyroid disease, n (%)		14 (8.8)	10 (6.3)	0.399

The majority had gestational diabetes mellitus (GDM) (75.0%), while one-quarter (25.0%) had pre-existing diabetes. The median gestational age at diagnosis was 26 weeks [IQR: 24–28]. At diagnosis, the mean fasting plasma glucose was 5.6 ± 0.7 mmol/L, and the mean 2-hour OGTT value was 9.0 ± 1.4 mmol/L. The mean HbA1c at booking was 6.3 ± 0.8%, which declined slightly to 6.0 ± 0.7% in the third trimester, indicating modest improvement in glycemic control over pregnancy. Regarding management, most women were treated with metformin (45.0%), followed by dietary modification alone (28.8%), insulin therapy (15.0%), and combination therapy with metformin and insulin (11.3%). Overall, satisfactory glycemic control was achieved in 70.0% of diabetic participants.

Table – II: Glycemic and clinical profile of diabetic pregnant women (*n*=160)

Variable		Value
DM subtype, n (%)	Pre-GDM	40 (25.0)
	GDM	120 (75.0)
GA at DM diagnosis (weeks), median [IQR]		26 [24–28]
Fasting plasma glucose at diagnosis (mmol/L), mean ± SD		5.6 ± 0.7
2-hr OGTT (mmol/L), mean ± SD		9.0 ± 1.4
HbA1c at booking (%), mean ± SD		6.3 ± 0.8
HbA1c in 3rd trimester (%), mean ± SD		6.0 ± 0.7
Treatment, n (%)	Diet	46 (28.8)
	Metformin	72 (45.0)
	Insulin	24 (15.0)
	Combo (metformin+insulin)	18 (11.3)
Glycemic control achieved*, n (%)		112 (70.0)

Overall, complications were more frequent among women with diabetes, though most differences did not reach statistical significance. Gestational hypertension and pre-eclampsia/eclampsia were observed more commonly in the diabetic group (18.8% and 11.3%, respectively) compared to the non-diabetic group (11.3% and 6.3%). Notably, polyhydramnios occurred significantly more often among diabetic mothers (13.8%) than non-diabetic ones (5.0%) (*p = 0.016*). The rates of oligohydramnios, antepartum haemorrhage, urinary tract infection, preterm labour, and suspected intrauterine growth restriction (IUGR) were similar between groups. Although antenatal hospital admissions were more frequent in the diabetic group (25.0% vs. 16.3%), this difference did not reach statistical significance (*p = 0.062*).

Table – III: Comparison of antenatal complications between diabetic and non-diabetic pregnant women (*n*=320)

Outcome	DM (n = 160)	Non-DM (n = 160)	*p*-value
Gestational hypertension, n (%)	30 (18.8)	18 (11.3)	0.083
Pre-eclampsia / eclampsia, n (%)	18 (11.3)	10 (6.3)	0.141
Polyhydramnios, n (%)	22 (13.8)	8 (5.0)	0.016*
Oligohydramnios, n (%)	10 (6.3)	12 (7.5)	0.659
Antepartum haemorrhage, n (%)	6 (3.8)	4 (2.5)	0.519
Urinary tract infection, n (%)	28 (17.5)	20 (12.5)	0.219
Preterm labour (<37 w), n (%)	30 (18.8)	20 (12.5)	0.149
IUGR suspected, n (%)	16 (10.0)	22 (13.8)	0.317
Any antenatal admission, n (%)	40 (25.0)	26 (16.3)	0.062

The mean gestational age at delivery was significantly lower in the diabetic group compared to the non-diabetic group (37.9 ± 2.0 vs. 38.5 ± 1.8 weeks; *p = 0.012*). Mode of delivery differed notably between groups, with a higher rate of caesarean section among diabetic mothers (52.5%) compared to non-diabetic mothers (36.3%) (*p = 0.011*). In comparison, spontaneous vaginal delivery was more common in the non-diabetic group (55.0% vs. 40.0%). Fetal macrosomia was a significantly more frequent indication for caesarean delivery among diabetic women (12.5% vs. 3.8%; *p = 0.006*). Shoulder dystocia was also observed more often in diabetic mothers (5.0%) than in non-diabetic mothers (1.3%) (*p = 0.049*). Other intrapartum complications, including failed induction, post-partum haemorrhage, maternal ICU admission, and maternal mortality, showed no statistically significant differences between the two groups.

Table – IV: Delivery and intrapartum outcomes among diabetic and non-diabetic mothers (*n*=320)

Outcome		DM (n=160)	Non-DM (n=160)	*p*-value
Gestational age at delivery (weeks), mean ± SD		37.9 ± 2.0	38.5 ± 1.8	0.012*
Mode of delivery, n (%)	Spontaneous vaginal	64 (40.0)	88 (55.0)	0.011*
	Instrumental	12 (7.5)	14 (8.8)	
	Caesarean section (overall)	84 (52.5)	58 (36.3)	
Indication: fetal macrosomia, n (%)		20 (12.5)	6 (3.8)	0.006*
Indication: failed induction, n (%)		18 (11.3)	12 (7.5)	0.243
Induction of labour, n (%)		56 (35.0)	42 (26.3)	0.096
Shoulder dystocia, n (%)		8 (5.0)	2 (1.3)	0.049*
Post-partum haemorrhage, n (%)		14 (8.8)	10 (6.3)	0.399
Maternal ICU admission, n (%)		6 (3.8)	2 (1.3)	0.151
Maternal death, n (%)		0 (0.0)	0 (0.0)	-

Infants of diabetic mothers had a significantly higher mean birthweight compared to those of non-diabetic mothers (3300 ± 560 g vs. 3050 ± 520 g; *p < 0.001*). Birthweight distribution differed notably between groups, with a higher incidence of macrosomia (≥4000 g) among the diabetic group (16.3% vs. 5.0%) and fewer low-birth-weight infants (*p = 0.023*). Similarly, large-for-gestational-age (LGA) infants were significantly more common among diabetic mothers (18.8% vs. 7.5%; *p = 0.007*). Neonatal hypoglycaemia occurred markedly more often in infants of diabetic mothers (21.3% vs. 3.8%; *p < 0.001*), highlighting a key metabolic complication associated with maternal diabetes. NICU admissions were also significantly higher in the diabetic group (28.8% vs. 16.3%; *p = 0.010*), and their median hospital stay was longer (3 [2–5] vs. 2 [1–3] days; *p = 0.002*). Other neonatal complications, such as low Apgar scores, congenital anomalies, respiratory distress, hyperbilirubinaemia, and sepsis, were more frequent among infants of diabetic mothers but did not reach statistical significance. Perinatal mortality was slightly higher in the diabetic group (3.8% vs. 1.3%), though this difference was not statistically significant.

Table – V: Neonatal outcomes among infants born to diabetic and non-diabetic mothers (*n*=320)

Outcome		DM (n=160)	Non-DM (n=160)	*p*-value
Birthweight (g), mean ± SD		3300 ± 560	3050 ± 520	<0.001*
Birthweight category, n (%)	LBW <2500 g	22 (13.8)	28 (17.5)	0.023*
	2500–3999 g	112 (70.0)	124 (77.5)	
	Macrosomia ≥4000 g	26 (16.3)	8 (5.0)	
Small for GA, n (%)		18 (11.3)	24 (15.0)	0.345
Large for GA, n (%)		30 (18.8)	12 (7.5)	0.007*
Apgar < 7 at 1 min, n (%)		22 (13.8)	14 (8.8)	0.179
Apgar < 7 at 5 min, n (%)		8 (5.0)	4 (2.5)	0.247

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Congenital anomalies (major), n (%)	6 (3.8)	2 (1.3)	0.154
Neonatal hypoglycaemia†, n (%)	34 (21.3)	6 (3.8)	<0.001*
Respiratory distress, n (%)	20 (12.5)	12 (7.5)	0.157
Hyperbilirubinaemia requiring phototherapy, n (%)	38 (23.8)	26 (16.3)	0.104
Sepsis (clinical/culture-proven), n (%)	12 (7.5)	10 (6.3)	0.666
NICU admission, n (%)	46 (28.8)	26 (16.3)	0.010*
Length of stay (days), median [IQR]	3 [2 – 5]	2 [1 – 3]	0.002*
Perinatal mortality, n (%)	6 (3.8)	2 (1.3)	0.151

Adverse maternal outcomes, defined as the occurrence of at least one of pre-eclampsia, postpartum haemorrhage, ICU admission, or maternal death, were significantly more frequent among diabetic mothers (21.3%) compared to non-diabetic mothers (11.3%), with a relative risk (RR) of 1.9 (95% CI: 1.1–3.3; *p = 0.028*). Similarly, adverse neonatal outcomes comprising at least one of NICU admission, hypoglycaemia, respiratory distress syndrome, or perinatal death were substantially higher in the diabetic group (36.3%) than in the non-diabetic group (21.3%), corresponding to an RR of 1.7 (95% CI: 1.2–2.5; *p = 0.006*).

Table – VI: Comparison of composite adverse maternal and neonatal outcomes between diabetic and non-diabetic groups

Composite outcome	Definition	DM (n = 160)	Non-DM (n = 160)	RR (95 % CI)	*p*-value
Adverse Maternal Outcome	≥1 of: pre-eclampsia, PPH, ICU admission, or maternal death	34 (21.3 %)	18 (11.3 %)	1.9 (1.1 – 3.3)	0.028
Adverse Neonatal Outcome	≥1 of: NICU admission, hypoglycaemia, RDS, perinatal death	58 (36.3 %)	34 (21.3 %)	1.7 (1.2 – 2.5)	0.006

After adjustment for potential confounders, diabetes mellitus emerged as a significant independent predictor, with diabetic women nearly twice as likely to experience adverse outcomes compared to non-diabetic women (AOR = 1.94; 95% CI: 1.18–3.20; p = 0.009). Advanced maternal age (≥35 years) also showed a significant association (AOR = 1.72; 95% CI: 1.00–2.95; p = 0.048), as did hypertension (chronic or pregnancy-related), which doubled the risk (AOR = 2.02; 95% CI: 1.05–3.88; p = 0.034). Although obesity (BMI ≥ 27.5 kg/m^2) and poor glycaemic control among diabetic women showed trends toward higher odds of adverse outcomes (AOR = 1.56 and 0.62, respectively), these associations did not reach statistical significance (p = 0.078 and p = 0.092). Other factors, including primiparity, urban residence, and adequate antenatal care (≥4 visits), were not significantly associated with adverse outcomes.

Table – VII: Multivariable logistic regression analysis showing predictors of adverse pregnancy outcome

Predictor (reference = absent)	Adjusted OR (95 % CI)	*p*-value
Diabetes Mellitus (yes)	1.94 (1.18 – 3.20)	0.009
Maternal age ≥ 35 y	1.72 (1.00 – 2.95)	0.048
BMI ≥ 27.5 kg/m^2 (Obese)	1.56 (0.95 – 2.55)	0.078
Primiparity	1.23 (0.73 – 2.08)	0.438
Hypertension (chronic/pregnancy)	2.02 (1.05 – 3.88)	0.034
Urban residence	1.20 (0.70 – 2.08)	0.507
≥ 4 ANC visits	0.78 (0.45 – 1.33)	0.349
Glycaemic control achieved (yes) [DM only model]	0.62 (0.36 – 1.08)	0.092

DISCUSSION

Our comparative study demonstrates that diabetes in pregnancy (predominantly gestational diabetes mellitus, GDM, with a minority of pre-existing diabetes) is associated with significantly higher risks of adverse maternal and neonatal outcomes than normoglycemic pregnancies. These findings are consistent with a large body of recent literature, which similarly reports increased obstetric interventions and neonatal morbidity among diabetic mothers [20-22]. In our cohort, diabetic women had higher body mass index (BMI). They were more often overweight or obese, consistent with other studies showing that GDM mothers tend to be older and heavier both recognized risk factors for GDM and adverse outcomes [14,20]. Karkia et al. in the UK reported similar demographic trends in more than 50,000 pregnancies [20]. Advanced maternal age (≥ 35 years) in our study also independently predicted adverse outcomes, paralleling global findings that older mothers have greater risks of GDM, pre-eclampsia, and cesarean section [23]. Hypertension further doubled adverse-outcome risk in our data, confirming evidence that co-morbid hypertensive disorders amplify diabetes-related risks [24,25]. Hypertensive disorders were more frequent in our diabetic group (≈ 30% vs 17%), diabetic women carry a 2-4 times increased risk of a hypertensive pregnancy compared to non-diabetic people [26]. Ye et al. reported an adjusted odds ratio (aOR) of 1.46 for pre-eclampsia in GDM pregnancies [21]. Polyhydramnios, significantly higher among our diabetic mothers, is also wellrecognized as a hyperglycemia-related complication [20]. Mean gestational age at delivery was lower among diabetic mothers, consistent with prior studies linking GDM to greater risk of preterm delivery [21,22]. Ye et al. found that GDM increased the risk of preterm birth by ~1.5 times, while Preda et al. reported preterm labour in 17.72% of GDM cases [21,27]. Caesarean section (CS) rates were significantly higher in our diabetic group (52.5% vs 36.3%), aligning with previous reports [28,29]. Our higher relative risk likely reflects macrosomia, which is an indication consistent with a previous study [30]. Shoulder dystocia occurred more often among diabetic mothers (5.0% vs 1.3%), attributable to larger fetuses. Although Ye et al. found no independent association after birth-weight adjustment, our result underscores the clinical relevance of close intrapartum management [21]. Poolsup et al. showed that treating even mild GDM halves the risk of shoulder dystocia and macrosomia, confirming the benefits of active management [31]. Post-partum haemorrhage (PPH) did not differ significantly. However, multiple studies show a link between gestational diabetes mellitus (GDM) and a higher risk of postpartum hemorrhage (PPH), possibly due to differences in sample size or parity [32,33]. Composite adverse maternal outcomes were almost twice as frequent in our diabetic mothers (RR 1.9), paralleling Alshomrany et al., who reported aOR 1.46 for significant complications [34]. Pregestational diabetes generally carries an even higher risk; another study found more severe complications than in GDM pregnancies [35]. Infants of diabetic mothers in our cohort had significantly higher mean birth weight (3300 g vs 3050 g) and more macrosomia (16.3% vs 5.0%), consistent with meta-analyses showing ~1.7-fold higher odds of macrosomia in GDM [36]. A Bangladeshi study reported nearly identical rates (16% vs 4%) [22]. The lower frequency of small-for-gestational-age infants in people with diabetes also agrees with Karkia et al., reflecting an upward shift in the birth-weight distribution [21]. Neonatal hypoglycemia was strikingly more common in infants of diabetic mothers (21.3% vs 3.8%), approximately 8-30% of neonates born to mothers with diabetes [37]. Voormolen et al. found hypoglycemia in one-third of infants of GDM mothers, supporting universal neonatal glucose screening. Despite relatively reasonable maternal glycemic control (mean HbA1c ~ 6.0%), our elevated neonatal hypoglycemia underscores persistent metabolic risk even with treatment [38]. NICU admission was significantly higher in the diabetic group (28.8% vs 16.3%), consistent with global evidence showing roughly doubled NICU need [21]. The main reasons hypoglycemia and respiratory distress mirror patterns in the BMJ meta-analysis are not specified [21]. Although our respiratory-distress difference was not statistically significant, the trend aligns with a previous study that reported an OR of 1.57 for neonatal RDS in insulin-treated GDM [39]. Perinatal mortality was slightly higher among diabetic mothers (3.8% vs 1.3%), though not significant, consistent with modern studies showing no residual increase after reasonable glycemic control [40]. However, pregestational diabetes remains high-risk; Clement et al. reported OR 7.3 for stillbirth and 4.2 for perinatal death [41]. Congenital anomalies were only slightly higher in our diabetic group, again consistent with findings that GDM (diagnosed after organogenesis) seldom increases malformation risk, unlike poorly controlled pregestational diabetes [41]. Our findings emphasize early screening, tight glycemic control, and multidisciplinary management. Universal screening at 24–28 weeks or earlier for high-risk women is critical, as adverse outcomes persisted despite modestly reasonable control. Overall, our findings reaffirm global evidence that diabetes, particularly when combined with obesity or hypertension, nearly doubles adverse pregnancy risks, necessitating vigilant, multidisciplinary care.

Limitations of the study: The main limitation of this study is that it was conducted in a single urban tertiary hospital, which may limit the generalizability of the findings. The observational design also introduces possible selection bias and prevents causal conclusions. Additionally, the relatively small number of women with pre-existing diabetes reduced the power to detect some associations. Glycemic control was assessed with limited markers, and lifestyle factors such as diet and physical activity were not fully captured. Lastly, neonatal follow-up ended at discharge, so long-term maternal and infant outcomes could not be evaluated.

CONCLUSION

This study demonstrates that diabetes mellitus during pregnancy, both gestational and pre-existing, is significantly associated with increased risks of adverse maternal and neonatal outcomes compared to non-diabetic pregnancies. Diabetic mothers experienced higher rates of hypertensive disorders, cesarean delivery, and polyhydramnios, while their infants were more likely to develop macrosomia, hypoglycemia, and require NICU admission. Even with reasonable glycemic control, the risk of complications remained elevated. These findings highlight the critical importance of early screening, optimal glucose management, and multidisciplinary antenatal care to improve maternal and neonatal outcomes in diabetic pregnancies. Strengthening preventive strategies and ensuring close follow-up for women with GDM can substantially reduce pregnancy-related morbidity and mortality.

RECOMMENDATIONS

This study recommends early and universal screening for gestational diabetes, especially among high-risk women, along with comprehensive multidisciplinary care to ensure optimal glucose control and close monitoring of both mother and fetus. Deliveries should take place in well-equipped facilities with neonatal support to manage potential complications like hypoglycemia. Postpartum glucose testing and lifestyle counseling are essential to prevent future diabetes in mothers.

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