Journal: Texila International Journal of Academic Research
Publisher: Texila International Journal
ISSN: 2520-3088
Volume 13 Issue 2, 2026
DOI: 10.21522/TIJAR.2014.13.02.Art021

Gestational Diabetes Mellitus in Guyana: Clinical Profiles, Obstetric Outcomes, and Predictors of Adverse Events — A Retrospective Cohort Analysis

Samantha N. A. Kennedy[1]*, Michael Olabode Timori[2], Abiodun Olaiya Paul[3]
[1]Primary Healthcare Department, Ministry of Health, Georgetown, Guyana
[2]Department of Public Health, Texila American University, Guyana
[3]Nigeria Emergency Operations Centre (NEOC) Data Team / TEPHINET-CDC, Abuja, Nigeria

Abstract

Gestational diabetes mellitus (GDM) is a growing metabolic complication of pregnancy with significant public health implications in low- and middle-income countries. This retrospective cohort study characterises the clinical and obstetric profiles of 33 GDM-confirmed mothers who delivered at the Georgetown Public Hospital Corporation (GPHC), Guyana, in January to June 2017, and identifies predictors of adverse maternal and neonatal outcomes. Data were extracted from hospital charts using a standardised abstraction form covering sociodemographic, anthropometric, obstetric, glycaemic, and neonatal variables. The cohort had a mean age of 29.9 ± 6.6 years and was predominantly Afro-Guyanese (60.6%) and urban-dwelling (75.8%). Mean pre-pregnancy body mass index (BMI) was 32.1 ± 10.4 kg/m², with 57.6% classified as overweight or obese. Family history of diabetes was present in 21.2% of participants. Insulin monotherapy or combination regimens were used in 97.0% of cases. Caesarean section rate was 45.5%, and gestational hypertension was the most frequent complication, affecting 36.4% of the cohort. Macrosomia occurred in 15.2% of births (mean birth weight 3,392 ± 676 g). Breastfeeding was initiated by 84.8% of participants. Postpartum metabolic follow-up data were absent across all time points, representing a critical systemic gap. Findings underscore the need for preconception BMI screening, structured postpartum surveillance registries, and culturally tailored non-communicable disease prevention strategies for women with a history of GDM in Guyana.

Keywords: *Caesarean Section, Caribbean Maternal Health, Gestational Diabetes Mellitus, Gestational Hypertension, Macrosomia, Postpartum Follow-Up.*

Introduction

Gestational diabetes mellitus (GDM) is defined as glucose intolerance with onset or first recognition during pregnancy, representing one of the most prevalent metabolic complications of gestation globally [1]. Prevalence estimates range from 5% to 20%, varying by diagnostic criteria, population characteristics, and regional epidemiological context [2]. Beyond immediate perinatal consequences—including macrosomia, birth trauma, neonatal hypoglycaemia, and increased rates of operative delivery—GDM confers durable long-term risks for both mothers and offspring, including type 2 diabetes mellitus (T2DM), cardiovascular disease (CVD), and metabolic syndrome [3, 4].

In Guyana, as across the broader Caribbean, non-communicable diseases (NCDs) account for a substantial and growing proportion of the disease burden, against a background of socioeconomic constraints and variable

Received: 02.02.2026 ***Accepted: 10.03.2026*** ***Published on: 30.04.2026***
****Corresponding Author: kennedysamantha238@gmail.com***

healthcare access. The intersection of ethnic diversity—Indo-Guyanese, Afro-Guyanese, Amerindian, and Mixed populations—with dietary transitions, physical inactivity, and uneven healthcare access creates a complex risk environment for metabolic disorders during pregnancy [5]. Despite global recognition of GDM's implications, population-specific data on its burden, clinical management, and perinatal outcomes in Guyana remain extremely limited.

This study was conducted as the baseline analytical component of a broader 10-year retrospective investigation examining the long-term maternal and child health consequences of GDM in Guyana. The immediate objective is to characterise the clinical and obstetric profiles of GDM-affected mothers who delivered at the Georgetown Public Hospital Corporation (GPHC)—the country's principal tertiary referral centre—to identify predictors of adverse pregnancy outcomes, and to document gaps in the postpartum follow-up data infrastructure critical for long-term outcome assessment. Findings are expected to inform strengthened GDM screening protocols, postnatal surveillance frameworks, and evidence-based policy for maternal and child health in Guyana.

Materials and Methods

Study Design and Setting

A retrospective cohort study design was employed, drawing on chart-extracted data from the obstetrics and gynaecology records of the Georgetown Public Hospital Corporation (GPHC), Georgetown, Guyana. GPHC is the country's largest public tertiary hospital and the principal referral centre for high-risk obstetric cases nationally. The study focuses on the index delivery year of 2017, representing the earliest cohort within the planned 10-year retrospective window.

Study Population and Sampling

The source population comprised all women who delivered at GPHC between 1 January 2017 and 30 June 2017. Eligible participants were mothers with a confirmed GDM diagnosis documented in hospital records during the index pregnancy. Complete case-extraction was undertaken for 33 GDM-positive mothers identified from available chart records of a total of 42 GDM-positive mothers (78.57% of the total GDM pregnancies for the specified cohort) who comply with the inclusion criteria of the study. The GPHC Guidelines for diagnosis and treatment of diabetes in pregnancy, updates November 2013 include a FBS ≥ 92 mg/dl or following 2hr GTT with any of the following values FPG ≥ 92 1hr ≥ 180 2hr ≥ 155.

Inclusion and Exclusion Criteria

Inclusion criteria: Women with a chart-confirmed GDM diagnosis during the index pregnancy who delivered at GPHC in January to June 2017.

Exclusion criteria: Records with no GDM status documentation; pre-gestational diabetes mellitus (Type 1 or Type 2 diabetes diagnosed prior to pregnancy); and records lacking both obstetric and neonatal outcome data.

Data Collection and Variables

Data were extracted from paper-based hospital charts using a standardised data abstraction form. Variables collected spanned five domains: (i) sociodemographic characteristics (age, ethnicity, education, occupation, residence); (ii) anthropometric and metabolic indices (pre-pregnancy weight, height, body mass index, fasting glucose, oral glucose tolerance test [OGTT] values); (iii) obstetric history (gravidity, parity, prior GDM, family history of diabetes and CVD); (iv) index pregnancy outcomes (GDM diagnosis date and method, treatment modality, gestational age at delivery, mode of delivery, birth weight, APGAR score, pregnancy complications, and breastfeeding initiation); and (v) postpartum follow-up data (weight, fasting glucose, HbA1c at year-1, year-5, and year-10 time points; long-term diagnoses of T2DM, hypertension, CVD, and metabolic syndrome).

Variable Definitions

1. **Macrosomia:** Birth weight ≥ 4,000 g.
2. **Preterm birth:** Delivery before 37 completed weeks of gestation.
3. **Gestational hypertension:** New-onset hypertension after 20 weeks of gestation without proteinuria, as documented in clinical records (defined as systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg, without significant proteinuria or other severe features of pre-eclampsia) [21, 24]. Lower Segment Caesarean Section (LSCS): surgical delivery via an incision through the lower uterine segment, preferred over classical caesarean section owing to reduced intraoperative blood loss and a lower risk of uterine rupture in subsequent pregnancies [22, 23].
4. **BMI classification:** Based on WHO criteria.

Statistical Analysis

Data were entered into a structured spreadsheet (Microsoft Excel 2019) with standardised variable coding. Continuous variables were summarised using means and standard deviations (SD). Categorical variables were described as frequencies and proportions. BMI was classified per World Health Organization (WHO) criteria: underweight (<18.5 kg/m²), normal (18.5–24.9), overweight (25.0–29.9), obese (30.0–34.9), and severely obese (≥35.0 kg/m²) [6]. Mixed coding inconsistencies in raw chart data were standardised prior to analysis. Pregnancy complications were coded from free-text fields using pre-defined category definitions. All analyses were performed in Python (version 3.11) using the pandas and numpy libraries.

Ethical Approval

This study was conducted as part of a PhD research programme approved by the Ministry of Health Guyana Institutional Review Board, GPHC Research Committee and governed by Texila American University institutional research oversight. All data were de-identified; study IDs replaced hospital medical record numbers in all analytical datasets. No participant intervention or contact was involved in this retrospective record review.

Results

Sociodemographic Characteristics

Thirty-three women with confirmed GDM diagnoses were included in this analysis. Sociodemographic and baseline characteristics are presented in Table 1. The mean age at delivery was 29.9 years (SD 6.6; range 16–40). The cohort was predominantly Afro-Guyanese (n=20, 60.6%), followed by East Indian (n=7, 21.2%), other ethnicities (n=4, 12.1%), mixed (n=1, 3.0%), and Amerindian (n=1, 3.0%). Most participants resided in urban areas (n=25, 75.8%). Educational attainment was poorly documented (45.5% recorded as not stated); among those with documented education, secondary-level completion was most common (n=7, 21.2%). Family history of diabetes was present in seven participants (21.2%), and five (15.2%) reported a prior GDM pregnancy.

Table 1. Sociodemographic and Baseline Characteristics of GDM Mothers (n=33)

Characteristic	n (%)
Mean age (SD), years	29.9 (6.6)
Ethnicity: Afro-Guyanese	20 (60.6%)
Ethnicity: East Indian	7 (21.2%)
Ethnicity: Other / Mixed / Amerindian	6 (18.2%)
Urban residence	25 (75.8%)

Education: Secondary	7 (21.2%)
Education: Primary	6 (18.2%)
Education: University	4 (12.1%)
Family history of diabetes	7 (21.2%)
Family history of CVD	3 (9.1%)
Previous GDM	5 (15.2%)

Anthropometric and Metabolic Profile

Pre-pregnancy anthropometric data are summarised in Table 2. Mean pre-pregnancy BMI was 32.1 kg/m² (SD 10.4; range 14.9–51.8). Overweight and obesity (including severe obesity) were predominant, affecting 57.6% of participants with documented BMI. Three participants were underweight at pre-pregnancy assessment. Ten records lacked sufficient data for BMI classification. Among the 10 participants with documented fasting glucose values, the mean was 124.4 mg/dL (SD 45.0)—substantially above the diagnostic threshold of 92 mg/dL recommended by the International Association of Diabetes and Pregnancy Study Groups (IADPSG) [7]. OGTT data were available in a limited subset only.

Table 2. Anthropometric and Metabolic Characteristics

Parameter	Value	n with Data
Mean pre-pregnancy weight (SD), kg	74.0 (25.1)	26
Mean pre-pregnancy BMI (SD), kg/m²	32.1 (10.4)	23
BMI: Underweight (<18.5)	3 (9.1%)	23
BMI: Normal (18.5–24.9)	2 (6.1%)	23
BMI: Overweight (25.0–29.9)	6 (18.2%)	23
BMI: Obese (30.0–34.9)	6 (18.2%)	23
BMI: Severely obese (≥35.0)	6 (18.2%)	23
BMI: Not documented	10 (30.3%)	—
Mean fasting glucose (SD), mg/dL	124.4 (45.0)	10
OGTT 1-hr documented	4 records (12.12%)	4
OGTT 2-hr documented	3 records (9.09%)	3

Obstetric History and GDM Management

Gravidity ranged from primigravida to grand multipara (gravidity 6). Five participants (15.2%) had a documented previous GDM pregnancy. Insulin monotherapy was the most frequently employed treatment modality (n=20, 60.6%), followed by diet plus insulin combination (n=5, 15.2%) and insulin-metformin combinations (n=5, 15.2%). Table 3 summarises treatment distribution across the cohort [8, 9].

Table 3. GDM Treatment Modalities (n=33)

Treatment Modality	n	%
Insulin (monotherapy)	20	60.6%
Diet + Insulin	5	15.2%
Insulin + Metformin	5	15.2%
Metformin (monotherapy)	1	3.0%

Insulin + Exercise	1	3.0%
Exercise + Insulin	1	3.0%

Delivery and Neonatal Outcomes

Mean gestational age at delivery was 37.8 weeks (SD 2.2). Mode of delivery was split between spontaneous vaginal delivery (SVD; n=18, 54.5%), lower segment caesarean section (LSCS; n=15, 45.5%), and vaginal delivery (n=2, 6.1%), yielding an overall operative delivery rate of 45.5%. Mean birth weight was 3,392 grams (SD 676 g; range 2,200–4,800 g). Macrosomia (birth weight ≥4,000 g) was recorded in five cases (15.2%), with one extreme case of 4,800 grams. APGAR scores were optimal (9 or 10 at 5 minutes) for the majority of neonates. Breastfeeding was initiated in 28 participants (84.8%). Delivery and neonatal outcomes are detailed in Table 4 [10, 11].

Table 4. Delivery and Neonatal Outcomes (n=33)

Outcome	**Value**
Mean gestational age at delivery (SD), weeks	37.8 (2.2)
Delivery mode: SVD (Spontaneous Vaginal Delivery)	18 (54.5%)
Delivery mode: LSCS (Lower Segment Caesarean Section)	15 (45.5%)
Mean birth weight (SD), grams	3,392 (676)
Macrosomia (≥4,000 g)	5 (15.2%)
Minimum birth weight, grams	2,200
Maximum birth weight, grams	4,800
Breastfeeding initiated	28 (84.8%)

Pregnancy Complications

Pregnancy complications were recorded from free-text chart entries. Gestational hypertension (GHTN) was the most prevalent complication, affecting 12 participants (36.4%). Macrosomia was present in five cases (15.2%), preterm birth in three (9.1%), intrauterine growth restriction (IUGR) in one (3.0%), postpartum haemorrhage (PPH) in one (3.0%), and severe anaemia in one (3.0%). Several participants had concurrent complications. Table 5 presents complication frequencies [12, 13].

Table 5. Frequency of Pregnancy Complications (n=33)

Complication	**n**	**%**
Gestational hypertension (GHTN)	12	36.4%
Macrosomia	5	15.2%
Preterm birth	3	9.1%
Perineal lacerations (2nd/4th degree)	2	6.1%
Intrauterine growth restriction (IUGR)	1	3.0%
Postpartum haemorrhage (PPH)	1	3.0%
Severe anaemia (Hb 5.3 g/dL)	1	3.0%
Shoulder dystocia	1	3.0%
Failed induction/augmentation	1	3.0%

Postpartum Follow-Up Data

Postpartum surveillance data were critically limited across all follow-up time points. At the 1-year postpartum visit, most records contained only a date notation (e.g., '6 weeks', '2 weeks') or the entry 'NS' (not stated), with no metabolic values recorded. At year-5 and year-10 follow-up windows, all fasting glucose, HbA1c, and diagnostic outcome fields (T2DM, hypertension, CVD events, metabolic syndrome) were entirely empty across the cohort. Postpartum contraception was documented in only five participants: three bilateral tubal ligation (BTL) and two intrauterine device (IUD) insertions. This represents a fundamental gap in the longitudinal data infrastructure.

Discussion

This retrospective cohort analysis of 33 GDM-confirmed mothers at GPHC reveals several clinically significant patterns. The cohort was characterised by high pre-pregnancy overweight and obesity prevalence (57.6% combined), a mean BMI substantially above healthy range (32.1 kg/m²), a family history of diabetes in over one-fifth of participants, a caesarean delivery rate exceeding 45%, and gestational hypertension in over one-third. Macrosomia was recorded in 15.2% of births. These findings are broadly consistent with—and in several parameters exceed—published rates from comparable low- and middle-income Caribbean settings [14, 15].

When considered collectively, the data across all five tables point to a pattern that extends beyond individual clinical findings. A pharmacologically managed, high-risk population was identified and actively treated during pregnancy, yet the absence of any postpartum metabolic follow-up data suggests that structured long-term care was not provided after delivery. The sections that follow examine what these findings indicate about GDM care delivery, postpartum surveillance, and NCD prevention within the Guyanese health system.

The baseline and clinical data shown in Tables 1-3 characterize a cohort whose individual risk variables significantly increase the trajectory toward postpartum type 2 diabetes mellitus (T2DM) because they are mutually reinforcing rather than acting independently.

Over 80% of participants belong to groups — Afro-Guyanese and East Indian — for whom GDM-to-T2DM progression rates are documented to be two to four times higher than those of White counterparts [25, 26]. Yet these groups are not homogeneous in mechanism: Afro-Guyanese women face compounded structural vulnerability through differential access to preventive care and higher baseline hypertension prevalence [27], while East Indian women carry a physiologically distinct susceptibility [28].

Elevated pre-pregnancy BMI and associated insulin resistance are established contributors to GDM severity. In this cohort, 54.4% of women with documented BMI were obese or severely obese, and the mean fasting glucose at diagnosis of 124.4 mg/dL substantially exceeded the IADPSG threshold of 92 mg/dL, indicating that glucose dysregulation was marked at the point of diagnosis [29]. The high proportion of women requiring insulin (97% of pharmacologically treated cases) is consistent with this degree of hyperglycaemia and with published evidence that insulin requirement during a GDM pregnancy is associated with greater underlying metabolic impairment and a higher risk of postpartum T2DM [6]. Gestational hypertension (36.4%) and macrosomia (15.2%) add further dimensions to the postpartum risk profile of this cohort, both being associated with adverse long-term cardiovascular and metabolic outcomes in women with prior GDM [27, 28, 31].

GHTN was documented in 36.4% of this GDM cohort, substantially higher than general obstetric population estimates of 6–10% in the Caribbean region [12]. The co-occurrence of GDM and hypertensive disorders of pregnancy reflects shared pathophysiological pathways involving placental dysfunction, endothelial injury, and oxidative stress [16]. This co-occurrence amplifies maternal cardiovascular risk trajectories postpartum, with direct implications for the long-term follow-up component of this research programme. The absence of documented long-term hypertension outcomes in this dataset underscores an urgent need to establish structured postpartum cardiovascular surveillance.

Lower Segment Caesarean Section (LSCS) was performed in 45.5% of cases [22, 23]. The 45.5% caesarean section rate substantially exceeds the WHO's recommended population-level caesarean rate of 10–15% [17] and is consistent with rates reported from high-risk GDM populations in the Caribbean and Latin America [18]. Macrosomia—present in 15.2% of this cohort—directly increases the likelihood of cephalopelvic disproportion and operative delivery. The downstream public health cost of elevated caesarean rates warrants targeted clinical guideline development at GPHC.

Insulin dominated the treatment landscape, used in 97.0% of the cohort in some form. This reflects GPHC's role as a tertiary facility managing complex obstetric cases. The limited use of metformin as monotherapy (one case) is notable, given accumulating evidence of comparable glycaemic efficacy for metformin in GDM with a more favourable cost and administration profile [19]. As Guyana's clinical guidelines evolve, expanded metformin uptake in appropriate patient subgroups may enhance treatment accessibility in resource-constrained settings.

Breastfeeding was initiated in 84.8% of participants—a rate that exceeds global averages and is a positive finding in this cohort. Breastfeeding is associated with reduced maternal T2DM risk following GDM and with reduced offspring adiposity and metabolic risk, making it a potentially protective modifiable factor of direct relevance to long-term outcome analyses planned for subsequent study phases [20].

Structured postpartum follow-up is a recognised component of GDM management, spanning postnatal metabolic review, primary care handover, and longer-term NCD surveillance. Chen and Zhu (2024) note that adherence to postpartum metabolic screening remains poor across settings, with neither obstetric nor primary care services consistently taking responsibility for this follow-up phase [27]. The findings of this study are consistent with that observation. Women who used insulin during pregnancy, delivered macrosomic infants, experienced gestational hypertension, or had a prior GDM history — characteristics associated with heightened risk of postpartum T2DM — had no recorded metabolic outcomes at any follow-up time point. Chen and Zhu (2024) identify the first three to six postpartum years as the period during which T2DM risk is highest and preventive intervention is most likely to be effective [27]. Kramer et al. (2021), in a systematic review and meta-analysis of postpartum intervention studies, found that structured lifestyle programmes and pharmacological approaches including metformin are associated with meaningful reductions in T2DM progression in women with prior GDM [6, 30]. The absence of any postpartum follow-up documentation in this dataset indicates that this preventive window was not utilised, and that the infrastructure to support it was not in place at the time of the study.

The extent of missing data across this cohort reflects practical limitations of the paper-based recording system in use at GPHC during the study period. Educational attainment was unrecorded in 45.5% of participants; BMI was undocumented in 30.3%; fasting glucose values were absent in 70% of records; and OGTT results were recorded for fewer than 12% of the cohort. These gaps affect variables directly relevant to risk stratification and postpartum care planning. In the absence of an integrated electronic health record or a minimum dataset standard for GDM, it is not possible to reliably link a woman's obstetric history to her subsequent primary care encounters, limiting the ability of community-level providers to identify women who may benefit from postpartum metabolic screening. Establishing a structured GDM register and standardising data capture for key metabolic and sociodemographic variables would support more effective longitudinal follow-up and enable generation of local burden estimates to guide health system planning.

GDM represents a well-defined period of elevated NCD risk during which women are in active contact with the health system, creating a practical opportunity for preventive intervention. Lavery et al. (2017) have noted that the antenatal and immediate postpartum period is associated with heightened health awareness and behavioural engagement [32]. The women in this cohort were identified, diagnosed, and treated during pregnancy, establishing a clinical record that documented risk factors for postpartum T2DM. Progression from gestational hyperglycaemia to overt T2DM is associated with serious long-term complications including cardiovascular disease, retinopathy, nephropathy, and recurrent GDM in subsequent pregnancies [28, 29]. In a health system with limited specialist endocrinology and nephrology capacity, primary prevention through postpartum screening and early lifestyle intervention is particularly relevant. Practical steps such as a standardised GDM discharge plan, a postpartum OGTT as a routine quality indicator, and linkage of obstetric and primary care records could support more systematic follow-up of women with a GDM history, without requiring substantial additional infrastructure investment.

The ethnic distribution of this cohort reflects the composition of the GPHC obstetric population, with Afro-Guyanese women comprising the majority of GDM cases (60.6%). This is relevant to postpartum risk assessment, as published data indicate that Black and Afro-Caribbean women have higher rates of T2DM progression following GDM than White women, a difference attributed to a combination of physiological factors including adiposity patterns and inflammatory profiles, as well as sociostructural determinants such as healthcare access and dietary environment [33, 34]. Krieger's ecosocial framework offers a useful theoretical lens for understanding how social and structural conditions become embedded in health outcomes over time [37]. Within this context, GDM management focused solely on glycaemic control during pregnancy may be insufficient to address the longer-term metabolic risk trajectory of Afro-Guyanese women, for whom postpartum follow-up and lifestyle support may be particularly important.

East Indian women, comprising 21.2% of this cohort, represent a population for whom standard BMI-based risk thresholds may underestimate metabolic risk. Research on South Asian populations has identified a tendency toward greater visceral adiposity relative to total body mass, which is associated with insulin resistance and impaired glucose metabolism at BMI values below conventional obesity thresholds [35]. Rayanagoudar et al. (2016), in a meta-analysis of 95,750 women, found that non-white ethnicity was associated with a higher risk of T2DM following GDM [31]. These findings suggest that ethnicity-informed risk stratification, rather than BMI-based criteria alone, would be more appropriate for prioritising postpartum follow-up in this population.

The near-complete absence of socioeconomic data in this cohort is a methodological limitation with practical implications for postpartum risk management. Variables such as household income, educational attainment, food security, and proximity to health services are recognised determinants of postpartum OGTT uptake, adherence to lifestyle modification, and access to pharmacological prevention [36]. McCarthy et al. (2023) found that clinical and social characteristics at delivery partially accounted for racial differences in post-GDM T2DM incidence and noted that more granular socioeconomic measurement would be needed to understand these disparities more fully [26]. Janevic et al. (2023) similarly documented significant ethnic variation in T2DM development after GDM [25]. Routine collection of standardised sociodemographic and social determinants data within the GDM antenatal record would enable more targeted postpartum follow-up and improve identification of women most at risk of being lost to follow-up after delivery.

Improving the collection of socioeconomic data within the GDM care pathway would require the systematic inclusion of a standardised minimum dataset within the antenatal record — capturing variables such as income quintile, educational attainment, household food security, housing stability, and proximity to health services — and carrying this information forward into postpartum follow-up documentation. Without such data, it is not possible to identify which women face the greatest structural barriers to attending postpartum screening, sustaining lifestyle changes, or accessing preventive medications. Ethnicity and socioeconomic position do not merely modify an individual's biological risk; they also shape whether the health system's response to that risk is accessible in practice. Targeted postpartum follow-up, informed by these determinants, would be a more equitable and effective approach than universal protocols applied without regard to the structural differences in how women experience care after GDM.

Limitations

Several limitations require acknowledgement. First, the retrospective chart-based design is constrained by documentation practices at the time of care; a substantial proportion of records had key variables entered as 'not stated', particularly metabolic parameters and sociodemographic data. Second, the absence of a contemporaneous non-GDM control group precludes formal comparative analysis of complication rates. Third, the relatively small sample size (n=33) limits statistical power for multivariable modelling. Fourth, the study is restricted to GPHC and may not represent GDM management across private facilities or rural settings in Guyana. These limitations will be systematically addressed in the broader 10-year retrospective study design.

Conclusion

This baseline cohort analysis establishes the clinical and obstetric profile of GDM-affected mothers at GPHC, Guyana, and lays the empirical foundation for a 10-year retrospective investigation of long-term maternal and child outcomes. Key findings—including high pre-pregnancy obesity rates, elevated gestational hypertension and caesarean section rates, macrosomia in one in six births, and predominantly insulin-based management—have direct implications for clinical guidelines and preventive programming in Guyana's public health system.

Critically, the complete absence of postpartum metabolic follow-up underscores a systemic gap in the GDM care continuum requiring structural health system strengthening. Recommendations arising from this analysis include: (i) implementation of standardised pre-pregnancy BMI screening and counselling within antenatal care platforms; (ii) establishment of a dedicated GDM postpartum follow-up registry at GPHC; (iii) integration of annual fasting glucose and HbA1c monitoring into routine maternal health services for women with prior GDM; and (iv) development of culturally and ethnically tailored lifestyle modification programmes to interrupt the pathway from GDM to T2DM and cardiovascular disease. Future phases of this research will incorporate prospective participant follow-up surveys and linkage with national health registries to generate the first comprehensive long-term GDM outcome data for Guyana.

Conflict of Interest

The authors declare that there is no conflict of interest.

Ethical Approval

This study was approved by the Institutional Review Board, Ministry of Health, Guyana, the Georgetown Public Hospital Corporation Research Committee and conducted under Texila American University PhD programme governance. All data were de-identified prior to analysis in accordance with institutional ethical standards for retrospective record review.

Author Contributions

Samantha N.A. Kennedy: conceptualisation, data curation, formal analysis, writing—original draft. Michael Tomori: supervision, co-author. Abiodun Olaiya Paul: methodology, writing—review and editing.

Funding

No external funding was received for this study.

Data Availability

The de-identified dataset supporting the findings of this study is available from the corresponding author upon reasonable request, subject to institutional data governance requirements.

Acknowledgements

The authors acknowledge, the Director of Medical and Professional Services GPHC, Dr. Navendranauth Rambaran, the management and clinical staff of the Georgetown Public Hospital Corporation, Obstetrics and Gynaecology Department, and the management and staff of the Records Department of the GPHC for facilitating access to hospital records, and Dr. Latoya Young (Senior Registrar, GPHC) and Dr. Michael Tomori (Texila American University Guyana) for supervisory support.

References

[1]. American Diabetes Association., 2021, Classification and diagnosis of diabetes: Standards of Medical Care in Diabetes. *Diabetes Care*, 44(Suppl 1), S15–S33, https://doi.org/10.2337/dc21-S002

[2]. Guariguata, L., Linnenkamp, U., Beagley, J., Whiting, D. R., Cho, N. H., 2014, Global estimates of the prevalence of hyperglycaemia in pregnancy. *Diabetes Research and Clinical Practice*, 103(2), 176–185, https://doi.org/10.1016/j.diabres.2013.11.003

[3]. Bellamy, L., Casas, J. P., Hingorani, A. D., Williams, D., 2009, Type 2 diabetes mellitus after gestational diabetes: a systematic review and meta-analysis. *Lancet*, 373(9677), 1773–1779, https://doi.org/10.1016/S0140-6736(09)60731-5

[4]. Lowe, W. L., Scholtens, D. M., Lowe, L. P., Kuang, A., Nodzenski, M., Talbot, O., Catalano, P. M., 2019, Association of gestational diabetes with maternal disorders of glucose metabolism and childhood adiposity. JAMA, 320(10), 1005–1016, https://doi.org/10.1001/jama.2018.11628

[5]. Pan American Health Organization., 2019, Non-Communicable Diseases in the Caribbean: Key Findings and Priority Actions. *Pan American Health Organization*, Washington DC, https://doi.org/10.37774/9789275122013

[6]. World Health Organization., 2000, Obesity: Preventing and Managing the Global Epidemic. Report of a WHO Consultation. WHO Technical Report Series No. 894. World Health Organization, Geneva, https://apps.who.int/iris/handle/10665/42330

[7]. Metzger, B. E., Gabbe, S. G., Persson, B., Buchanan, T. A., Catalano, P. A., Damm, P., Dyer, A. R., 2010, International Association of Diabetes and Pregnancy Study Groups recommendations on

the diagnosis and classification of hyperglycemia in pregnancy. *Diabetes Care*, 33(3), 676–682, https://doi.org/10.2337/dc09-1848

[8]. Balsells, M., Garcia-Patterson, A., Sola, I., Roque, M., Gich, I., Corcoy, R., 2015, Glibenclamide, metformin, and insulin for the treatment of gestational diabetes: a systematic review and meta-analysis. *BMJ*, 350, h102, https://doi.org/10.1136/bmj.h102

[9]. Castillo, W. C., Boggess, K., Sturmer, T., Brookhart, M. A., Jonsson Funk, M., 2015, Trends in glyburide compared with insulin use for gestational diabetes treatment in the United States. *Obstetrics and Gynecology*, 123(6), 1177–1184, https://doi.org/10.1097/AOG.0000000000000638

[10]. Dookeeram, D., Bidaisee, S., Paul, J. F., Maharaj, V., Joseph, M., Jankey, N., Morean, M., 2016, Perinatal outcomes and gestational diabetes mellitus in a Caribbean tertiary care facility. *Journal of Maternal-Fetal and Neonatal Medicine*, 29(24), 4050–4057, https://doi.org/10.3109/14767058.2016.1141886

[11]. Kamana, K. C., Shakya, S., Zhang, H., 2015, Gestational diabetes mellitus and macrosomia: a literature review. *Annals of Nutrition and Metabolism*, 66(Suppl 2), 14–20, https://doi.org/10.1159/000371628

[12]. Hutcheon, J. A., Lisonkova, S., Joseph, K. S., 2011, Epidemiology of pre-eclampsia and the other hypertensive disorders of pregnancy. *Best Practice and Research Clinical Obstetrics and Gynaecology*, 25(4), 391–403, https://doi.org/10.1016/j.bpobgyn.2011.01.006

[13]. Catalano, P. M., Shankar, K., 2017, Obesity and pregnancy: mechanisms of short term and long term adverse consequences for mother and child. *BMJ*, 356, j1, https://doi.org/10.1136/bmj.j1

[14]. Figueroa, R., Cuervo, L. G., Mancera, L., 2014, Gestational diabetes in Latin America and the Caribbean: a systematic review. *Global Health Action*, 7, 23995, https://doi.org/10.3402/gha.v7.23995

[15]. Sacks, D. A., Hadden, D. R., Maresh, M., Deerochanawong, C., Dyer, A. R., Metzger, B. E., 2012, Frequency of gestational diabetes mellitus at collaborating centers based on IADPSG consensus panel-recommended criteria: the Hyperglycemia and Adverse Pregnancy Outcome (HAPO) Study. *Diabetes Care*, 35(3), 526–528, https://doi.org/10.2337/dc11-1641

[16]. Vounzoulaki, E., Khunti, K., Abner, S. C., Tan, B. K., Davies, M. J., Gillies, C. L., 2020, Progression to type 2 diabetes in women with a known history of gestational diabetes: systematic review and meta-analysis. BMJ, 369, m1361, https://doi.org/10.1136/bmj.m1361

[17]. World Health Organization., 2015, WHO Statement on Caesarean Section Rates. WHO/RHR/15.02. World Health Organization, Geneva, https://apps.who.int/iris/handle/10665/161442

[18]. Torloni, M. R., Betran, A. P., Horta, B. L., Nakamura, M. U., Atallah, A. N., Moron, A. F., Valente, O., 2009, Prepregnancy BMI and the risk of gestational diabetes: a systematic review of the literature with meta-analysis. *Obesity Reviews*, 10(2), 194–203, https://doi.org/10.1111/j.1467-789X.2008.00541.x

[19]. Brown, J., Grzeskowiak, L., Williamson, K., Downie, M. R., Crowther, C. A., 2017, Insulin for the treatment of women with gestational diabetes. *Cochrane Database of Systematic Reviews*, 11, CD012037, https://doi.org/10.1002/14651858.CD012037.pub2

[20]. Much, D., Beyerlein, A., Rossbauer, M., Hummel, S., Ziegler, A. G., 2014, Beneficial effects of breastfeeding in women with gestational diabetes mellitus. *Molecular Metabolism*, 3(3), 284–292, https://doi.org/10.1016/j.molmet.2014.01.002

[21]. ACOG, 2016, Practice Bulletin No. 222: Gestational Hypertension and Preeclampsia. Obstetrics & *Gynecology*, 135(6), e237–e260.

[22]. NICE (National Institute for Health and Care Excellence), 2021, Caesarean birth. NICE Guideline [NG192], Date of access: 06/04/2026. https://www.nice.org.uk/guidance/ng192

[23]. RCOG (Royal College of Obstetricians and Gynaecologists), 2021, Classification of Urgency of Caesarean Section. Good Practice Guideline No. 11.

[24]. WHO (World Health Organization), 2018, WHO Recommendations for Prevention and

Treatment of Pre-eclampsia and Eclampsia (Geneva, Switzerland: World Health Organization).

[25]. Janevic, T., Liu, S. H., Huynh, M., et al., 2023, Racial and ethnic inequities in development of type 2 diabetes mellitus after gestational diabetes mellitus. *Obstet Gynecol*. 142(4):901–910. Doi:10.1097/AOG.0000000000005324.

[26]. McCarthy, K. J., Liu, S. H., Huynh, M., et al., 2023, Influence of gestational diabetes mellitus on diabetes risk and glycemic control in a retrospective population-based cohort. *Diabetes Care*. 46(8):1483–1491. Doi:10.2337/dc22-1676.

[27]. Chen, L., Zhu, Y., 2024, Gestational diabetes mellitus and subsequent risks of diabetes and cardiovascular diseases: the life course perspective and implications of racial disparities. *Curr Diab Rep*. 24(11):244–255. Doi:10.1007/s11892-024-01552-4

[28]. Abubakar, M., et al., 2025, Unveiling gestational diabetes: an overview of pathophysiology and management. *Int J Mol Sci.* 26(5):2320. Doi:10.3390/ijms26052320.

[29]. Juan, J., Sun, Y., Wei, Y., et al., 2022, Progression to type 2 diabetes mellitus after gestational diabetes mellitus diagnosed by IADPSG criteria: systematic review and meta-analysis. *Front Endocrinol (Lausanne)*. 13:1012244. Doi:10.3389/fendo.2022.1012244.

[30]. Kramer, C. K., Campbell, S., Retnakaran, R., 2021, Factoring in the risk of type 2 diabetes in women with gestational diabetes: a systematic review and meta-analysis. *Clin Obstet Gynecol*. 64(1):234–243. Doi:10.1097/GRF.0000000000000585.

[31]. Rayanagoudar, G., Hashi, A. A., Zamora, J., Khan, K. S., Hitman, G. A., Thangaratinam, S., 2016, Quantification of the type 2 diabetes risk in women with gestational diabetes: a systematic review and meta-analysis of 95,750 women. *Diabetologia*, 59(7):1403–1411. Doi:10.1007/s00125-016-3927-2.

[32]. Lavery, J. A., Friedman, A. M., Keyes, K. M., Wright, J. D., Ananth, C. V., 2017, Gestational diabetes in the United States: temporal changes in prevalence rates between 1979 and 2010. *BJOG*, 124(5):804–813. Doi:10.1111/1471-0528.14236.

[33]. Caballero, A. E., Diabetes in the Hispanic or Latino population: genes, environment, culture, and more. *Curr Diab Rep*. 2018;18(12):132. Doi:10.1007/s11892-018-1086-5.

[34]. Goedecke, J. H., Micklesfield, L. K., 2014, The effect of dietary fatty acids on insulin resistance. *Proc Nutr Soc*. 73(1):104–119. Doi:10.1017/S0029665113003595.

[35]. Yabe, D., Seino, Y., Fukushima, M., Seino, S., 2015, Beta cell dysfunction versus insulin resistance in the pathogenesis of type 2 diabetes in East Asians. *Curr Diab Rep*,15(6):36. Doi:10.1007/s11892-015-0608-4.

[36]. Daneshmand, S. S., Stortz, S., Morrisey, R., Faksh A., 2019, Bridging gaps and understanding disparities in gestational diabetes mellitus to improve perinatal outcomes. *Diabetes Spectr*, 32(4):317–323. Doi:10.2337/ds18-0082.

[37]. Krieger, N., 2001, Theories for social epidemiology in the 21st century: an ecosocial perspective. *Int J Epidemiol*, 30(4):668–677. Doi:10.1093/ije/30.4.668.