Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Obstetrics and Gynecology Research

Journal homepage: www.ijogr.org

Original Research Article

Impact of gestational diabetes mellitus on maternal and perinatal outcomes: A prospective observational study in a tertiary hospital in south India

Vijaya Nandhini Rengarajan[1]*, Punithavathi J[1], Lakshmi Devi Selvarasu[1]

[1]Dept. of Obstetrics and Gynecology, Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur, Tamil Nadu, India

Abstract

Background: Gestational diabetes mellitus (GDM) is a major public health concern, associated with higher maternal and perinatal morbidity. This study is undertaken to evaluate the effect of GDM on perinatal and maternal outcomes among pregnant women reporting to a tertiary care hospital in Tamil Nadu.
Materials and Methods: A prospective observational study was conducted from November 2022 to October 2024 on 141 GDM and 141 non-GDM pregnant women. GDM was diagnosed by the 75g OGTT according to IADPSG criteria. Maternal details, pregnancy complication, and perinatal outcomes data were gathered and analyzed using SPSS version 21, and a p-value of less than 0.05 was taken as statistically significant.
Results: Of 2,965 deliveries, the incidence of GDM was 4.7%. A significant association existed between GDM and higher BMI ($p<0.001$) and family history of diabetes ($p<0.001$). GDM was associated with significantly higher preeclampsia ($p=0.020$), urinary tract infection ($p=0.008$), preterm labor ($p=0.001$), and Postpartum Hemorrhage ($p=0.015$). In addition, the GDM neonates were significantly more likely to have an elevated mean birth weight ($p=0.021$), signifying higher macrosomia risk. Also, neonatal hyperbilirubinemia occurred significantly more in infants with GDM ($p=0.02$). No significant differences reported in APGAR scores, mode of delivery, or hypoglycemia in neonates.
Conclusion: GDM is associated with increased maternal morbidity and perinatal complications, and thus, early detection and intervention are required. Lifestyle changes, intensive prenatal care, and postpartum glucose screening are essential in reducing risks to mother and child. The present study highlights the necessity of intensified screening programs and tailored care strategies for better maternal and neonatal health outcomes.

Keywords: Gestational diabetes mellitus, Perinatal outcomes, Maternal complications.

Received: 08-04-2025; **Accepted:** 07-05-2025; **Available Online**: 18-11-2025

1. Introduction

Gestational diabetes mellitus (GDM) presents a substantial public health issue, intricately linked to a spectrum of adverse maternal and perinatal outcomes.[1] GDM is defined as glucose intolerance first diagnosed during pregnancy. GDM is becoming more prominent because of a combination of evolving diagnostic criteria, lifestyle changes, and increasing rates of non-communicable diseases worldwide.[2] According to the International Association of Diabetes and Pregnancy Study Groups (IADPSG) criteria, GDM affects up to 11% of pregnancies worldwide.[3] The Indian Council of Medical Research (ICMR) has highlighted that the pathophysiology of GDM is influenced by contributory factors such as increasing obesity rates, dietary shifts, and sedentary lifestyles, further exacerbated by genetic susceptibilities, leading to a significant rise in GDM incidences.[4] This growing burden emphasizes the need for effective screening and management strategies to mitigate maternal and perinatal risks.

Maternal outcomes in GDM pregnancies often include an increased risk of preeclampsia, caesarean delivery, and progression to type 2 diabetes mellitus (T2DM). Indian studies suggest that women with GDM are at a heightened risk of developing T2DM compared to global averages, reinforcing the importance of postpartum screening and

*Corresponding author: Vijaya Nandhini Rengarajan
Email: nandhinirengarajan98@gmail.com

https://doi.org/10.18231/j.ijogr.80922.1763454217

lifestyle interventions to reduce long-term complications.[5-7] From a perinatal perspective, infants born to mothers with GDM are more susceptible to complications such as macrosomia, neonatal hypoglycemia, and preterm birth. Indian-specific findings further highlight the risk of neonatal morbidities, emphasizing the need for tailored monitoring protocols to improve neonatal outcomes. Additionally, the potential for long-term metabolic issues in offspring, including obesity and metabolic syndrome, underscores the importance of preventive strategies in this population.[6-8]

Managing GDM requires a comprehensive approach involving dietary modifications, increased physical activity, and pharmacological interventions when necessary. Given the rising incidence of GDM in India, early and extensive screening is crucial, particularly among women with risk factors such as elevated pre-gestational BMI, prior GDM history, or a family history of diabetes.[7,9] This study aims to assess the impact of GDM on perinatal and maternal outcomes among GDM mothers compared with non-GDM mothers attending a tertiary care hospital in South India. By investigating these outcomes, this study seeks to highlight the importance of early detection, appropriate intervention, and individualized care plans to improve the overall health of both mothers and infants affected by GDM.

2. Materials and Methods

This prospective observational study was conducted at a tertiary care hospital in Perambalur, South India, from November 2022 to October 2024. The study population included all 141 GDM-diagnosed pregnant women who attended the OPD during the study period. Age-matched control groups without GDM who delivered during the same period were included. Pregnant mothers with overt diabetes mellitus and those with comorbidities such as gestational hypertension and thyroid disorders were excluded from the study. Diagnosis of GDM was made by the Glucose Tolerance Test using 75 g glucose. Patient was categorized as GDM as per IADPSG criteria ie if any one value is more than the criteria (fasting blood sugar ≥92 mg/dl, 1 h Blood Sugar ≥180 mg/dl, and 2 h Blood Sugar ≥153 mg/dl) were categorised as GDM.

Data were collected using a pre-designed semi-structured questionnaire, with informed consent obtained before participation. Eligible participants were identified and interviews were conducted in Tamil to ensure clarity. Age verification was done using identification documents such as ration cards. All the participants' medical history, including bad obstetric history (BOH), comorbidities, anthropometric measurements, perinatal outcome were recorded. GDM confirmed pregnant women were advised on physical activity and diet, while those requiring insulin were admitted for management. Glucose values were recorded at diagnosis, and all participants were followed until delivery, with maternal and neonatal complications documented. Anonymity was maintained.

Data analysis was performed using SPSS software version 21, employing descriptive statistics (frequencies and percentages) and inferential statistics using the chi-square test, with a p-value of <0.05 considered significant. Ethical clearance was obtained from the Institutional Ethical Committee on Human Subjects (IECHS), and written informed consent was secured from all participants after explaining the study's risks, benefits, and voluntary nature.

3. Results

Out of 2965 deliveries, 141 (4.7%) mothers were diagnosed with GDM. A total of 141 GDM pregnant women and 141 non-GDM pregnant women were included in the study. Around 70% of the participants were diagnosed as GDM by fasting Blood sugar in the OGTT. More than 50% of them were advised for nutritional modification for GDM. (**Table 1**)

Table 1: Frequency distribution of the method of diagnosis and mode of treatment for GDM (n=141

Method of Diagnosis	**GDM (n=141) n (%)**
Fasting Blood Sugar	98 (69.5)
1-hour Blood Sugar	23 (16.3)
2-hour Blood Sugar	20 (14.2)
Modes of treatment for GDM	
Diet	111 (78.7)
Insulin	18 (12.8)
OHA	12 (08.5)

A significant association was found between BMI (Kg/m² ± SD) and a history of diabetes in the family between the pregnant mothers with GDM and non-GDM, whereas age and parity did not show an association. (**Table 2**)

Table 2: Demographic and pregnancy characteristics of the study participants (n=141)

Variable		**GDM (n=141)**	**Non-GDM (n=141)**	**p-value**
Age in Years (mean±SD)		3.231±3.2	30.5±4.1	0.254*
BMI (Kg/m^2±SD)		27.4 ± 5.2	24.8 ± 4.8	**<0.001**
History of diabetes in the family	Yes	47 (33.3)	16 (11.3)	**<0.001**
Parity	Primigravida	60 (45.8)	71 (54.2)	0.094
	Multigravida	81 (53.6)	70 (46.4)	

*unpaired t-test

Table 3: Antenatal complications and pregnancy outcomes of the study participants (n=141)

Variables		GDM (n=141)	Non-GDM (n=141)	p-value
Polyhydramnios	Yes	30 (56.6)	23 (60.3)	0.143
	No	111 (48.5)	118 (51.5)	
Preeclampsia	Absent	105 (46.1)	123 (53.9)	**0.020**
	Mild	23 (63.9)	13 (36.1)	
	Severe	13 (72.2)	05 (27.8)	
UTI	Yes	31 (65.9)	16 (34.1)	**0.008**
	No	110 (46.8)	125 (53.2)	
Preterm Labour	Yes	24 (77.4)	07 (22.5)	**0.001**
	No	117 (46.6)	134 (53.4)	
PROM	Yes	08 (61.5)	05 (38.5)	0.197
	No	133 (49.4)	136 (50.6)	
Mode of Delivery	Cesarean	85 (52.5)	77 (47.5)	0.167
	Vaginal	56 (46.7)	64 (38.3)	
Primary Postpartum Hemorrhage		7 (87.5)	1 (12.5)	**0.015**

*UTI- Urinary Tract Infection #PROM- Pre-Rupture of Membrane

Table 4: Distribution of perinatal outcome among the study participants

Variables		GDM (n=141)	Non-GDM (n=141)	p-value
Fetal Outcome	Livebirth	141 (100)	141 (100)	-
Birth weight in Kg	(mean±SD)	3.5±1.3	3.1±1.6	**0.021***
APGAR Score	1 min	8.0±1.1	8.1±1.3	0.486*
	5 min	8.6±1.3	8.7±1.6	0.565*
Shoulder dystocia		1 (100)	0	0.5#
Anomalies Absent		141 (100)	141 (100)	-
Hyperbilirubinemia	Present	6 (85.7)	1 (14.3)	**0.02**
Respiratory distress syndrome	Present	2 (100)	0	0.23#
Hypoglycemia	Present	6 (75)	2 (25)	0.07

*Unpaired t-test #Fisher Exact test

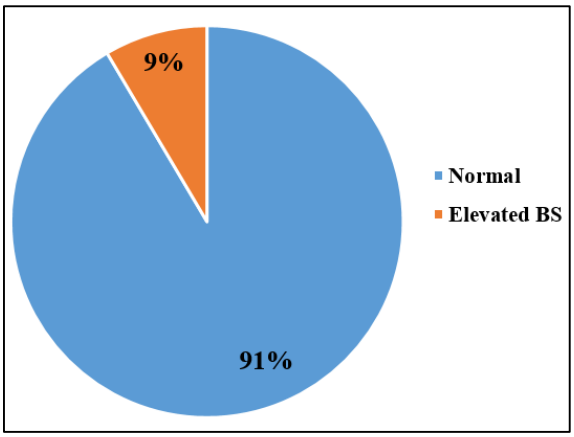

Figure 1: Prevalence of elevated BS on GTT after 6 weeks of Delivery among GDM mothers (n=141)

Table 2 shows that Preeclampsia was more prevalent among GDM pregnant women, with severe cases occurring in 72.2% of GDM pregnant women, compared to 27.8% in the non-GDM pregnant women, with a p-value of 0.020. UTI was also significantly higher among GDM pregnant women (65.9%) compared to non-GDM (34.1%) (p = 0.008). The chance of preterm labor was higher in the GDM pregnant women (77.4%) compared to the non-GDM (22.5%) (p = 0.001). PPH among GDM was higher (87.5%) than among non-GDM pregnant women (12.5%), with a p-value of 0.015. However, no statistically significant association was observed on the presence of polyhydramnios, PROM, or mode of delivery.

Around 9% of the GDM mothers reported increased Blood sugar levels on OGTT at the end of 6 weeks after the delivery. (**Figure 1**)

Infants born to mothers with GDM had a significantly higher mean birth weight (3.5±1.3 kg) compared to those in the non-GDM group (3.1±1.6 kg) (p = 0.021), indicating an increased risk of macrosomia. The Chance of neonatal hyperbilirubinemia was significantly higher in the GDM pregnant women (85.7%) than in the non-GDM pregnant women (14.3%) (p = 0.02), suggesting an increased chance of neonatal jaundice in infants of diabetic mothers. While APGAR scores at 1 and 5 minutes did not differ significantly between the groups, the occurrence of shoulder dystocia in one GDM case highlights the potential obstetric complications associated with fetal overgrowth.

4. Discussion

This cross-sectional study was conducted among 141 pregnant women with gestational diabetes mellitus (GDM) and 141 non-GDM pregnant women, aiming to evaluate the impact of GDM on perinatal and maternal outcomes among pregnant women attending a tertiary care hospital. Globally, GDM affects approximately 7% of pregnancies worldwide, amounting to over 200,000 cases annually.[10] The incidence varies across populations, ranging from 1% to 14%, due to differences in diagnostic criteria.[10] The present study reported that out of 2965 deliveries, 4.7% of pregnant mothers were diagnosed with GDM. Similar observations were made by Kumari R et al in Delhi (5.72%) and Zagar et al. in Kashmir (3.8%).[11,12] Whereas the study conducted by Nair et al. reported a 13% incidence of GDM,[13] Seshiah et al. in Tamil Nadu reported the incidence of GDM in urban areas at 17.8%, semi-urban areas at 13.8%, and rural areas at 9.9%.[14] Though the differences in the incidence may vary between the studies due to the differences in sample size, study population characteristics, and diagnostic criteria used by different studies, the pathophysiological consequences of GDM remain universal.

GDM diagnostic criteria play a vital role in the early management. In the present study, out of 141 GDM mothers, 69.5% were diagnosed with the fasting blood sugar level with OGTT, followed by 16.3% with 1-hour blood sugar level. Around 78.7% of them were managed with the diet, followed by insulin (12.8%). Our study findings were consistent with Kumari R et al.[11] ie, the diagnosis of GDM by fasting blood sugar OGTT was 75.9%, and 79.4% of them were managed by diet, followed by insulin, 12.1%. Similarly, the study conducted in Chennai found that 12.3% of them were treated with insulin.[15] This shows that the GDM develops in the pregnant woman due to a combination of genetic predisposition and pregnancy-induced hormonal changes, leading to insulin resistance.

The mean age of GDM mothers in this study was observed to be 32.3±3.2 years. This is consistent with findings from Ismail NA et al.,[16] who reported a mean maternal age of 31.9 ± 2.1 years among GDM mothers. However, Bener A et al. noted a higher prevalence in women aged 35–45 years.[10] These variations highlight the role of demographic and genetic factors in GDM risk.[10,12,18] The present study found there was a significant association between BMI (Kg/m^2) and history of diabetes mellitus in the family, and found no significant association between age and parity. Kumari R et al and Nair et al reported similar observations in their studies.[11,13] History of DM in the family was significantly higher among GDM mothers compared to the non-GDM mothers, showing strong evidence of the metabolic and genetic predisposition to GDM. This shows that the BMI (Kg/m^2) and history of diabetes mellitus in the family are important risk factors in predicting GDM. Identifying these risk factors early will help in targeted early prevention of GDM.

Early diagnosis and management of GDM remain crucial in preventing adverse maternal and neonatal outcomes. Despite effective screening strategies, GDM continues to pose significant risks if not adequately controlled. In the present study, we found that higher incidence of preeclampsia, UTI, Preterm labour, and PPH among GDM mothers than non-GDM with a significant association. Whereas the incidence of polyhydramnios, PROM, and mode of delivery were not significantly associated. Similar to our study, a study conducted by Nair et al, Dudhwadkar AR et al, and the HAPO study reported a higher incidence of preeclampsia among GDM mothers.[13,17,18] Krishnamoorthy et al reported a higher incidence of pre-term labour, PROM, and increased blood sugar level at the end of the 6th week among the GDM mothers.[19] Kumari et al., Nair et al., and the HAPO study reported that there was no association between mode of delivery and GDM.[11,13,18] International studies support the need for stringent glycemic management during pregnancy to improve outcomes.[20,21] This suggests that hyperglycaemia during pregnancy may contribute to immune alterations, vascular dysfunction, and impaired labor progress, thereby predisposing mothers to these complications.

Women diagnosed with GDM are at a significantly higher risk of developing Type 2 Diabetes Mellitus (T2DM) postpartum due to persistent β-cell dysfunction and insulin resistance. The present study's finding that approximately 9% of GDM mothers showed elevated blood sugar levels on OGTT at six weeks postpartum emphasizes this risk. This aligns with previous research indicating that a substantial proportion of women with GDM experience impaired glucose metabolism even after delivery.[22,23] The persistence of hyperglycaemia beyond the postpartum period suggests an ongoing metabolic vulnerability that may progress to overt diabetes if not monitored and managed effectively.

The study findings suggest mothers with GDM show distinct perinatal outcomes compared to those born to non-GDM mothers. The mean±SD of birth weight of babies was significantly higher among GDM mothers (3.5±1.3 kg) compared to non-GDM mothers (3.1±1.6 kg, p=0.021). This finding is consistent with previous studies, conducted by Bener A, Kumari R et al., Nair et al, et al., *Dudhwadkar AR et al.,* Farooq et al. and the HAPO study reported that maternal hyperglycaemia is directly associated with fetal overgrowth due to excessive transplacental glucose transfer, leading to macrosomia and an increased risk of birth-related complications.[10,11,13,17,24]

The APGAR scores at 1 minute (8.0±1.1 vs. 8.1±1.3, p=0.486) and 5 minutes (8.6±1.3 vs. 8.7±1.6, p=0.565) did not show a significant difference between the groups, indicating that immediate postnatal adaptation was similar in both groups. This aligns with findings from Kumari et al and Crowther et al., who reported that despite increased risks of fetal complications, APGAR scores tend to remain within a normal range among neonates born to GDM mothers

receiving appropriate management (2). Though one case of shoulder dystocia was observed in the GDM mother, it was not significant. Whereas the study conducted by Kumari et al. and Nair et al. found, higher incidence of shoulder dystocia, which indicates that macrosomia in GDM pregnancies is a major risk factor for shoulder dystocia and birth trauma.

The present study found that the Neonates of GDM mothers had a significantly higher incidence of hyperbilirubinemia (85.7% vs. 14.3%, p=0.02), consistent with the findings of Kumari et al, and Kwik et al, who reported an increased risk of neonatal jaundice in GDM mothers.[11,25] The present study also reported two cases of respiratory distress syndrome among neonates of GDM mothers, while none were observed in the non-GDM group (p=0.23). Although not statistically significant, this finding was similar to the Kumari R et al, and the HAPO Study identified GDM as a risk factor for delayed fetal lung maturation and an increased likelihood of neonatal respiratory complications.[11,18]

Neonatal hypoglycemia was more prevalent in neonates of GDM mothers (75% vs. 25%, p=0.07). This is supported by the Kumari R et al, HAPO study, Farooq et al., Abu-Heija AT et al., and Patil et al., who reported that neonates born to GDM mothers are prone to transient hypoglycemia due to fetal hyperinsulinemia, a compensatory response to maternal hyperglycaemia during pregnancy.[11,18,26,27] These results reinforce the need for optimal glycemic control during pregnancy to mitigate adverse neonatal outcomes.

5. Conclusion

This study shows the impact of GDM on maternal and perinatal outcomes. The incidence of GDM among pregnant mothers was 4.8%. GDM mothers reported a higher incidence of adverse maternal complications, like preeclampsia, urinary tract infections, preterm labor, and postpartum haemorrhage compared with non-GDM mothers. Perinatal complications found in the present study are increased birth weight (kg), hyperbilirubinemia, hypoglycemia, and respiratory distress syndrome were more prevalent among infants born to GDM mothers than non-GDM mothers.

The findings also suggest that GDM is strongly associated with increased BMI and a family history of diabetes mellitus. Identifying these risk factors early can facilitate targeted prevention and management strategies. Furthermore, the study confirms the long-term metabolic risk posed by GDM, as approximately 9% of GDM mothers exhibited elevated blood sugar levels postpartum, indicating a potential progression to type 2 diabetes mellitus (T2DM). This underscores the need for postpartum glucose monitoring and lifestyle interventions to reduce the risk of future diabetes.

GDM remains a critical public health concern due to its association with multiple maternal and neonatal complications. Effective screening, timely intervention, and postpartum follow-up are essential to mitigate these risks. Future research should focus on long-term maternal and child health outcomes and explore strategies for improving early detection and management of GDM to enhance pregnancy outcomes.

6. Source of Funding

None.

7. Conflict of Interest

None.

8. Ethical Approval

Ethical No.: IECHS/IRCHS/No.242.

References

1. World Health Organization. Diabetes Mellitus and Pregnancy: Clinical Guideline [Internet]. Geneva: World Health Organization; 2018 [cited 2024 Dec 16]. Available from: https://platform.who.int/docs/default-source/mca-documents/policy-documents/guideline/TTO-CC-31-03-GUIDELINE-2018-eng-Diabetes-Mellitus-Guideline.pdf
2. Alejandro EU, Mamerto TP, Chung G, Villavieja A, Gaus NL, Morgan E, et al. Gestational diabetes mellitus: a harbinger of the vicious cycle of diabetes. *Int J Mol Sci*. 2020;21(14):5003. https://doi.org/10.3390/ijms21145003.
3. Metzger BE, Gabbe SG, Persson B, Buchanan TA, Catalano PA, Damm P, et al. International Association of Diabetes and Pregnancy Study Groups Consensus Panel. International association of diabetes and pregnancy study groups recommendations on the diagnosis and classification of hyperglycemia in pregnancy. *Diabetes Care*. 2010;33(3):676–82. https://doi.org/10.2337/dc09-1848.
4. Plows JF, Stanley JL, Baker PN, Reynolds CM, Vickers MH. The pathophysiology of gestational diabetes mellitus. *Int J Mol Sci*. 2018;19(11):3342. https://doi.org/10.3390/ijms19113342.
5. Thanawala U, Divakar H, Jain R, Agarwal MM. Negotiating gestational diabetes mellitus in India: a national approach. *Medicina (Kaunas)*. 2021;57(9):942. https://doi.org/10.3390/medicina57090942.
6. Fuka F, Osuagwu UL, Agho K, Gyaneshwar R, Naidu S, Fong J, et al. Factors associated with macrosomia, hypoglycaemia and low Apgar score among Fijian women with gestational diabetes mellitus. *BMC Pregnancy Childbirth*. 2020;20(1):133. https://doi.org/10.1186/s12884-020-2821-6.
7. Kayal A, Mohan V, Malanda B, Anjana RM, Bhavadharini B, Mahalakshmi MM, et al. Women in India with Gestational Diabetes Mellitus Strategy (WINGS): methodology and development of model of care for gestational diabetes mellitus (WINGS 4). *Indian J Endocrinol Metab*. 2016;20(5):707–15. https://doi.org/10.4103/2230-8210.189230.
8. Kannaujiya AK, Kumar K, Upadhyay AK, McDougal L, Raj A, James KS, et al. Effect of preterm birth on early neonatal, late neonatal, and postneonatal mortality in India. *PLOS Glob Public Health*. 2022;2(6):e0000205. https://doi.org/10.1371/journal.pgph.0000205.
9. Kim C. Gestational diabetes: risks, management, and treatment options. *Int J Womens Health*. 2010;2:339–51. https://doi.org/10.2147/IJWH.S13333.
10. Bener A, Saleh NM, Al-Hamaq A. Prevalence of gestational diabetes and associated maternal and neonatal complications in a

fast-developing community: global comparisons. *Int J Womens Health*. 2011;3:367–73. https://doi.org/10.2147/IJWH.S26094.
11. Kumari R, Dalal V, Kachhawa G, Sahoo I, Khadgawat R, Mahey R, et al. Maternal and perinatal outcome in gestational diabetes mellitus in a tertiary care hospital in Delhi. *Indian J Endocrinol Metab*. 2018;22(1):116–20. https://doi.org/10.4103/ijem.IJEM_582_17.
12. Zargar AH, Sheikh MI, Bashir MI, Masoodi SR, Laway BA, Wani AI, et al. Prevalence of gestational diabetes mellitus in Kashmiri women from the Indian subcontinent. *Diabetes Res Clin Pract*. 2004;66(2):139–45. https://doi.org/10.1016/j.diabres.2004.02.023.
13. Nair VG, Sandhu GS, Biswas M, Bhalla R. Evaluation of the incidence and outcome of gestational diabetes mellitus using the current international consensus guidelines for diagnosing hyperglycaemia in pregnancy. *Int J Reprod Contracept Obstet Gynecol.* 2016;5(10):3361–6. https://doi.org/10.18203/2320-1770.ijrcog20163159.
14. Seshiah V, Balaji V, Balaji MS, Paneerselvam A, Arthi T, Thamizharasi M, et al. Prevalence of gestational diabetes mellitus in South India (Tamil Nadu) – A community based study. J Assoc Physicians India. 2008;56:329–33.
15. Balaji V, Balaji M, Anjalakshi C, Cynthia A, Arthi T, Seshiah V. Diagnosis of gestational diabetes mellitus in Asian-Indian women. *Indian J Endocrinol Metab*. 2011;15(3):187–90. https://doi.org/10.4103/2230-8210.83403.
16. Ismail NAM, Aris NM, Mahdy ZA, Ahmad S, Naim NM, Siraj HHH, et al. Gestational diabetes mellitus in primigravidae: a mild disease. *Acta Med (Hradec Kralove)*. 2011;54(1):21–4. https://doi.org/10.14712/18059694.2016.12.
17. Dudhwadkar AR, Fonseca MN. Maternal and fetal outcome in gestational diabetes mellitus. *Int J Reprod Contracept Obstet Gynecol*. 2016;5(10):3317–21. https://doi.org/10.18203/2320-1770.ijrcog20163193.
18. HAPO Study Cooperative Research Group. Hyperglycemia and Adverse Pregnancy Outcome (HAPO) Study: associations with neonatal anthropometrics. *Diabetes*. 2009;58(2):453–9. https://doi.org/10.2337/db08-1112.
19. Krishnamoorthy U, Schram CMH, Hill SR. Maternal obesity in pregnancy: is it time for meaningful research to inform preventive and management strategies? *BJOG*. 2006;113(10):1134–40. https://doi.org/10.1111/j.1471-0528.2006.01045.x.
20. Kouhkan A, Najafi L, Malek M, Baradaran HR, Hosseini R, Khajavi A, et al. Gestational diabetes mellitus: major risk factors and pregnancy-related outcomes: a cohort study. *Int J Reprod Biomed*. 2021;19(9):827–36. https://doi.org/10.18502/ijrm.v19i9.9715.
21. Zhang CH, Zhang PL. Adverse perinatal outcomes complicated with gestational diabetes mellitus in preterm mothers and preterm infants. *Exp Ther Med*. 2023;26(3):425. https://doi.org/10.3892/etm.2023.12124.
22. Kim C, Tabaei BP, Burke R, McEwen LN, Lash RW, Johnson SL, et al. Missed opportunities for type 2 diabetes mellitus screening among women with a history of gestational diabetes mellitus. *Am J Public Health*. 2006;96(9):1643–8. https://doi.org/10.2105/AJPH.2005.065722.
23. Casagrande SS, Linder B, Cowie CC. Prevalence of gestational diabetes and subsequent Type 2 diabetes among U.S. women. *Diabetes Res Clin Pract*. 2018;141:200–8. https://doi.org/10.1016/j.diabres.2018.05.010.
24. Farooq MU, Ayaz A, Ali Bahoo L, Ahmad I. Maternal and neonatal outcomes in gestational diabetes mellitus. *Int J Endocrinol Metab*. 2007;5(3):109–15.
25. Kwik M, Seeho SKM, Smith C, McElduff A, Morris JM. Outcomes of pregnancies affected by impaired glucose tolerance. *Diabetes Res Clin Pract*. 2007;77(2):263–8. https://doi.org/10.1016/j.diabres.2006.12.004.
26. Abu-Heija AT, Al-Bash M, Mathew M. Gestational and pregestational diabetes mellitus in Omani women: comparison of obstetric and perinatal outcomes. *Sultan Qaboos Univ Med J*. 2015;15(4):e496–500. https://doi.org/10.18295/squmj.2015.15.04.009.
27. Patel M, Singh M, Sachan P, Sachan R. Outcome in gestational diabetes mellitus after various treatment modality: a tertiary center experience in North India. *Ann Trop Med Public Health*. 2018;11(4):140. https://doi.org/10.4103/ATMPH.ATMPH_355_17.

Cite this article: Rengarajan VN, Punithavathi J, Selvarasu LD. Impact of gestational diabetes mellitus on maternal and perinatal outcomes: A prospective observational study in a tertiary hospital in south India. *Indian J Obstet Gynecol Res*. 2025;12(4):693–698.