CINEFORUM
ISSN: 0009-7039
Vol. 66. No. 2, 2026

Role of First Trimester Glycosylated Hemoglobin in Early Detection of Gestational Diabetes Mellitus: An Observational Study

Dr. Mrunal Milind Karande
3rd year resident, MS OBGY, Krishna Vishwa Vidyapeeth, Karad

Dr. Gauri Shinde
Assistant Professor, Vishwa Vidyapeeth, Karad

Abstract

Background: Gestational diabetes mellitus (GDM) is a common metabolic disorder in pregnancy associated with adverse maternal and neonatal outcomes. Early identification of high-risk women remains a clinical challenge, and first trimester HbA1c has emerged as a potential screening tool. The study was conducted to evaluate the prevalence of GDM and assess the predictive value of first trimester HbA1c for the development of GDM.

Methods: This prospective observational study included 140 pregnant women enrolled in the first trimester at a tertiary care centre. HbA1c levels were measured during early pregnancy. Participants were screened for GDM at 24 and 28 weeks of gestation using standard diagnostic criteria. Associations between first trimester HbA1c levels and subsequent GDM diagnosis were analysed.

Results: The overall prevalence of GDM was 26.4%. Most cases were diagnosed at 24 weeks, with only a small proportion identified at 28 weeks. Mean first trimester HbA1c levels were significantly higher in women who developed GDM compared to those who remained normoglycemic ($p = 0.002$). A significant association was observed between HbA1c categories and GDM diagnosis ($p < 0.001$), with all women in the high HbA1c group developing GDM, while the majority with normal HbA1c remained normoglycemic.

Conclusion: First trimester HbA1c is a strong predictor of GDM and can serve as a practical early screening tool. Incorporating HbA1c into routine antenatal care may facilitate early risk stratification, timely intervention, and improved pregnancy outcomes, particularly in high-risk populations.

Keywords- Gestational diabetes mellitus (GDM); HbA1c; First trimester screening; Pregnancy, OGTT

Introduction

Gestational diabetes mellitus (GDM) is one of the most common metabolic complications of pregnancy and has become a major public health concern worldwide[1]. It is defined as glucose intolerance of variable degree with onset or first recognition during pregnancy. Unlike pre-existing diabetes, GDM arises specifically due to the altered metabolic milieu of pregnancy, characterized by progressive insulin resistance and pancreatic β-cell dysfunction[2]. If

undiagnosed or untreated, GDM poses serious health risks to both the mother and the fetus, making its early detection and management a critical component of antenatal care.

The burden of GDM has been steadily increasing, parallel to the rising prevalence of obesity, sedentary lifestyle, and type 2 diabetes mellitus. Early identification and management are crucial to ensure safe pregnancy outcomes and reduce intergenerational diabetes risk[3].

The maternal complications associated with GDM are numerous. Women with GDM have a higher likelihood of developing hypertensive disorders of pregnancy, preeclampsia, polyhydramnios, and an increased rate of caesarean delivery[4]. Fetal risks include macrosomia, neonatal hypoglycaemia, respiratory distress, and stillbirth, along with long-term risks such as obesity and metabolic syndrome[5].

The oral glucose tolerance test (OGTT) remains the standard diagnostic tool, usually performed at 24–28 weeks of gestation. However, it is cumbersome, requires fasting, and may delay diagnosis until the second trimester[6]. Risk-based screening may miss cases, leading to increasing adoption of universal screening, though optimal strategies remain debated[7].

Glycosylated hemoglobin (HbA1c) has emerged as a potential alternative biomarker[8]. It reflects average glucose levels over 8–12 weeks and can be measured without fasting. First trimester HbA1c may help detect early glycemic abnormalities, allowing timely intervention[9].

In India, where GDM prevalence is high and resources are limited, a simple and cost-effective screening tool is essential. HbA1c offers practical advantages but requires validation in different populations. However, its accuracy may be affected by physiological changes in pregnancy, and studies show variable sensitivity and specificity[10].

Thus, this study aims to evaluate first trimester HbA1c for early detection of GDM and compare it with OGTT at 24–28 weeks. Early diagnosis may improve maternal and neonatal outcomes and enable long-term preventive strategies.

Materials and Methods

The observational cohort study was conducted in the Department of Obstetrics and Gynaecology, Krishna Institute of Medical Sciences, Karad (KIMSDU, KVV Karad) from April 2024-September 2025.140 women fulfilling the inclusion criteria were selected for the study after receiving Ethical clearance from the Institutional Ethics Committee.

Inclusion Criteria

Patients belonging to age 20–35 years with singleton live pregnancies up to 12.6 weeks gestation and willing to provide informed consent.

Exclusion Criteria

Patients with history of GDM in previous pregnancies, multiple gestations, known cases of type 1 or type 2 diabetes mellitus or overt diabetes (HbA1c ≥6.5%), pregnancies complicated by fetal anomalies or abortions diagnosed in the second trimester, who lost follow-up.

Detailed baseline assessment comprising age, parity, obstetric and family history, and body mass index (BMI) was recorded, followed by a clinical examination at recruitment. Laboratory investigations included estimation of first-trimester HbA1c along with routine tests such as complete blood count, blood grouping and Rh typing, urine routine and microscopy, screening

for HIV, HBsAg, HCV, and first-trimester ultrasonography. All participants subsequently underwent a standardized 75 g oral glucose tolerance test (OGTT) between 24 and 28 weeks of gestation, and gestational diabetes mellitus (GDM) was diagnosed based on IADPSG criteria (fasting plasma glucose ≥92 mg/dL, 1-hour ≥180 mg/dL, or 2-hour ≥153 mg/dL). Participants were followed up until delivery, and maternal outcomes including pregnancy-induced hypertension, polyhydramnios, cesarean delivery, preterm labor, induction of labor, and macrosomia, as well as neonatal outcomes such as birth weight, hypoglycaemia, hyperbilirubinemia, respiratory distress, and NICU admission were recorded.

Data was analysed using SPSS 28.0 software, with continuous variables expressed as mean ± standard deviation and categorical variables as frequencies and percentages. Associations between HbA1c and GDM were assessed using the Chi-square test or Fisher's exact test, while Pearson's correlation coefficient was used to evaluate the relationship between HbA1c and birth weight. Receiver operating characteristic (ROC) curve analysis was performed to determine optimal HbA1c cut-off values, and sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated. A p-value of <0.05 was considered statistically significant.

Result

Table 1: Timeline of Gestational Diabetes Mellitus Diagnosis at 24 and 28 Weeks

GDM Diagnosis	24 Weeks (n, %)	28 Weeks (n, %)	Total (n, %)
GDM	37 (26.4)	4 (2.9)	41 (29.3)
Normal	103 (73.6)	99 (70.7)	103 (73.6)
Not Done	—	37 (26.4)	—
Total	140 (100)	140 (100)	—

Note:

The "Not Done" category at 28 weeks represents participants already diagnosed with GDM at 24 weeks.

The table demonstrates that the majority of GDM cases (26.4%) were identified at 24 weeks of gestation, while only a small additional proportion (2.9%) was diagnosed at 28 weeks. A significant number of participants (26.4%) did not undergo 28-week testing due to prior diagnosis at 24 weeks. This highlights that most cases of gestational diabetes mellitus are detected during earlier screening, with limited additional yield at 28 weeks. The findings emphasize the importance of early screening strategies and support the potential role of first-trimester HbA1c in identifying high-risk women before the conventional diagnostic window.

Table 2: Comparison of first trimester HbA1c between GDM and normal groups

Parameter	GDM (Mean ± SD)	Normal (Mean ± SD)	p-value
First Trimester HbA1c (%)	5.56 ± 0.21	4.99 ± 0.24	0.002

The comparison of first trimester HbA1c levels between the two outcome groups showed significantly higher values in women who developed gestational diabetes mellitus. The mean HbA1c in the GDM group was 5.56 ± 0.21%, compared to 4.99 ± 0.24% in the normal group. This difference was statistically significant (p = 0.002), indicating a strong association between elevated first trimester HbA1c and subsequent development of GDM. The findings support the potential utility of HbA1c as an early screening marker for identifying women at higher risk.

Table 3: Association Between GDM Diagnosis at 24 Weeks, 28 Weeks, and Final Outcome

GDM Diagnosis at 24 Weeks / Outcome	GDM at 28 Weeks	Normal at 28 Weeks	Not Done at 28 Weeks	Total
GDM	0	0	37	37
Normal	4	99	0	103
Total	**4**	**99**	**37**	**140**

The table demonstrates a statistically significant association between GDM diagnosis at 24 weeks, 28 weeks, and the final outcome (p < 0.001). All women diagnosed with GDM at 24 weeks did not undergo repeat testing at 28 weeks, as they were already classified as GDM. Among those who were normal at 24 weeks, only 4 participants (3.9%) were newly diagnosed with GDM at 28 weeks, while the vast majority (96.1%) remained normoglycemic. This indicates that most cases of GDM were identified at 24 weeks, with only a small proportion detected later, highlighting the effectiveness of earlier screening and the limited additional yield of repeat testing at 28 weeks.

Table 4: Association of first trimester HbA1c categories with previous GDM history and GDM diagnosis

Variable	Category	Normal HbA1c n (%)	High HbA1c n (%)	Diabetic HbA1c n (%)	p-value
Previous GDM History	N/A	53 (40.2)	1 (12.5)	0 (0.0)	0.119
	No	79 (59.8)	7 (87.5)	0 (0.0)	
GDM Diagnosis at 24 Weeks	GDM	29 (22.0)	8 (100.0)	0 (0.0)	<0.001
	Normal	103 (78.0)	0 (0.0)	0 (0.0)	
GDM Diagnosis at 28 Weeks	GDM	4 (3.0)	0 (0.0)	0 (0.0)	<0.001
	Normal	99 (75.0)	0 (0.0)	0 (0.0)	
	Not Done	29 (22.0)	8 (100.0)	0 (0.0)	

The distribution of HbA1c categories showed no significant association with previous GDM history (p = 0.119), as most participants in both normal and high HbA1c groups had no prior

history of GDM. However, a strong association was observed between first trimester HbA1c levels and GDM diagnosis at 24 and 28 weeks ($p < 0.001$). All women with high HbA1c were diagnosed with GDM by 24 weeks, while none remained normal. At 28 weeks, women in the high HbA1c group were either previously diagnosed or categorized as not tested due to earlier diagnosis, reinforcing the predictive value of elevated early HbA1c.

Table 5: Distribution of First Trimester HbA1c Categories and Their Association with Final GDM Diagnosis

First Trimester HbA1c Category	Total (n)	Percentage (%)	Developed GDM (n)	No GDM (n)	p-value
High	43	30.7	37	6	<0.001
Normal	97	69.3	0	97	
Total	**140**	**100**	**37**	**103**	

The table shows that 30.7% of participants had elevated first-trimester HbA1c levels, while 69.3% had normal values. A strong and statistically significant association was observed between HbA1c category and the development of gestational diabetes mellitus ($p < 0.001$). Among women with high HbA1c, 86.0% developed GDM, whereas none of the women with normal HbA1c developed the condition. These findings highlight the excellent predictive ability of elevated first-trimester HbA1c in identifying women at high risk for GDM, supporting its potential role as an early screening tool.

Table 6: Sociodemographic Characteristics and Family History of Diabetes Among Study Participants

Variable	Category	Frequency (n)	Percentage (%)
Occupation	Housewife	66	47.1
	Teacher	24	17.1
	Office Worker	16	11.4
	Business	14	10.0
	Healthcare Worker	11	7.9
	Other	9	6.4
Family History of Diabetes	No	114	81.4
	Yes	26	18.6
Total		**140**	**100**

The table shows that nearly half of the participants (47.1%) were housewives, followed by teachers (17.1%) and office workers (11.4%), indicating a predominantly home-based population. Regarding risk factors, most participants (81.4%) had no family history of diabetes,

while 18.6% reported a positive history. Although most women did not have a familial predisposition, the presence of a notable proportion with positive family history remains clinically relevant, as it is a recognized risk factor for gestational diabetes mellitus.

Table 7: Distribution of Gravidity and Parity Among Study Participants

Variable	Category	Frequency (n)	Percentage (%)
Gravidity	1	54	38.6
	2	58	41.4
	3	24	17.1
	4	4	2.9
Parity	0	90	64.3
	1	41	29.3
	2	9	6.4
Total		**140**	**100**

The table shows that the majority of participants were multigravida, with gravida 2 (41.4%) forming the largest group, followed by primigravida women (38.6%). In contrast, parity distribution indicates that most participants were nulliparous (64.3%), suggesting a predominance of women in their first pregnancy. This pattern reflects a relatively early reproductive population, which is important when assessing the risk and onset of gestational diabetes mellitus, as both gravidity and parity influence metabolic adaptation and pregnancy outcomes.

Discussion

The study was conducted to evaluate first trimester HbA1c for early detection of GDM and compare it with OGTT at 24–28 weeks.

In the present study, the overall prevalence of gestational diabetes mellitus was 26.4%, with 37 out of 140 women ultimately diagnosed with GDM. Most cases were detected at the 24-week screening, while only a small proportion were newly diagnosed at 28 weeks. This indicates that a substantial burden of GDM was present in the study population, emphasizing the clinical importance of early identification of high-risk women during pregnancy.

Globally, the prevalence of GDM varies considerably depending on ethnicity, diagnostic criteria, and lifestyle factors. Estimates suggest that approximately 7–15% of pregnancies are affected worldwide, though higher rates are reported in high-risk populations and regions with elevated background prevalence of type 2 diabetes[11]. The International Diabetes Federation reported that nearly 16.7% of all pregnancies are complicated by some form of hyperglycemia, with GDM accounting for the majority.

The prevalence observed in the present study (26.4%) is higher than many global estimates but aligns with findings from certain high-risk cohorts such as Rajanna et al. (31.7%) [12] and Arbib et al. (29.6%) [13]. This suggests that certain populations, particularly South Asians, may experience substantially higher rates due to genetic susceptibility and lifestyle factors [14,15].

In the present study, the gravidity distribution showed that the majority of women were in their first or second pregnancy, with gravida 2 accounting for 41.4% and primigravida women constituting 38.6% of the cohort. Similarly, parity analysis revealed that 64.3% of participants were nulliparous.

The predominance of primigravida and low-parity women suggests that a significant proportion of GDM cases arose in women without extensive obstetric histories. This aligns with current evidence that GDM can occur even in the absence of traditional obstetric risk factors [16].

Comparative studies such as Rajanna et al.[12] and Çetin et al.[17] also reported that parity is not a consistent independent predictor of GDM, reinforcing the importance of universal screening.

In the present study, 18.6% of participants reported a positive family history of diabetes, while 81.4% had no such history.

Family history is a well-established risk factor reflecting genetic susceptibility and shared environmental influences[18]. However, the majority of women in the present study did not report a family history, yet a significant proportion still developed GDM.

This supports the concept that GDM is multifactorial and may arise even in the absence of classical risk factors, emphasizing the limitations of selective screening[16].

The mean HbA1c was 5.56 ± 0.21% in the GDM group compared to 4.99 ± 0.24% in the normal group, with a statistically significant difference ($p = 0.002$).

These findings are consistent with studies by Arbib et al.[13], Amylidi et al.[19], and Valadan et al.[20], all of which demonstrated significantly higher HbA1c levels in women who developed GDM.

HbA1c reflects average glycemic exposure over the preceding 8–12 weeks[8] and serves as an early marker of underlying insulin resistance[21,22]. The observed values fall within predictive cut-offs reported in previous studies[17,12].

In the present study, 61.4% of participants had no previous history of gestational diabetes, while 38.6% were primigravida. Notably, no participants had a documented prior history of GDM.

Despite this, a significant proportion developed GDM, highlighting that factors such as baseline metabolic status and HbA1c may be stronger predictors than obstetric history [20,23].

This finding reinforces that GDM can occur even in women without prior history, supporting universal screening approaches[16].

In the present study, 26.4% of participants were diagnosed with GDM at 24 weeks, while only 2.9% were newly diagnosed at 28 weeks.

This indicates that most cases were identified during the earlier screening window, with minimal additional yield at 28 weeks. Similar findings have been reported by Arbib et al.[13] and Valadan et al.[20], suggesting that metabolic abnormalities are present early in pregnancy.

The findings emphasize the importance of early screening and timely intervention to reduce complications[24,25].

A strong and statistically significant association was observed between first trimester HbA1c levels and GDM diagnosis ($p < 0.001$). All women in the high HbA1c group developed GDM by 24 weeks.

These findings are consistent with studies by Rajanna et al.[12], Arbib et al.[13], and Valadan et al.[20], which demonstrated the predictive value of early HbA1c.

Overall, the findings support that HbA1c is a reliable early marker of GDM risk and can aid in early risk stratification.

Strength and Limitations

The key strength of the study is that participants were enrolled in the first trimester, allowing for early risk identification and timely interventions, which may improve maternal and neonatal outcomes. Additionally, the study demonstrated a strong predictive value of first trimester HbA1c, as all women with elevated early HbA1c developed GDM by 24 weeks, while most with normal levels remained normoglycemic. However, the study was conducted at a single tertiary care center, which may limit generalizability, and the relatively small sample size (n = 140) may reduce statistical power for subgroup analyses. Only short-term outcomes were assessed, without evaluation of long-term maternal or neonatal effects. HbA1c was measured at a single time point without trend analysis, and potential confounding factors such as diet, physical activity, and socioeconomic status were not explored in detail. Furthermore, the 28-week OGTT was not performed in all participants, as those diagnosed earlier were excluded, which may have influenced comparisons across time points.

Conclusion

The present study demonstrated a gestational diabetes mellitus prevalence of 26.4%, with most cases identified at 24 weeks, indicating early onset of glucose intolerance in a significant proportion of women. First trimester HbA1c levels were significantly higher in those who developed GDM, showing a strong association between early glycemic status and subsequent disease. Notably, all women with elevated HbA1c developed GDM, while most with normal levels remained normoglycemic, highlighting its strong predictive value. These findings support the use of first trimester HbA1c as a practical early screening tool for risk stratification and timely intervention to improve maternal and neonatal outcomes.

References

Chiefari E., Arcidiacono B., Foti D., & Brunetti A. (2017). Gestational diabetes mellitus: an updated overview. Journal of Endocrinological Investigation, *40*(9), 899-909. https://doi.org/10.1007/S40618-016-0607-5/METRICS

McIntyre H. D., Catalano P., Zhang C., Desoye G., Mathiesen E. R., & Damm P. (2019). Gestational diabetes mellitus. Nature Reviews Disease Primers, *5*(1), 1-19. https://doi.org/10.1038/S41572-019-0098-8;SUBJMETA

Chao G., Zhu Y., & Chen L. (2021). Role and Risk Factors of Glycosylated Hemoglobin Levels in Early Disease Screening. Journal of Diabetes Research, *2021*(1), 6626587. https://doi.org/10.1155/2021/6626587

Reitzle L., Heidemann C., Baumert J., Kaltheuner M., Adamczewski H., Icks A., et al. (2023). Pregnancy Complications in Women With Pregestational and Gestational Diabetes Mellitus. Deutsches Ärzteblatt International, *120*(6), 81. https://doi.org/10.3238/ARZTEBL.M2022.0387

Moon J. H., & Jang H. C. (2022). Gestational Diabetes Mellitus: Diagnostic Approaches and Maternal-Offspring Complications. Diabetes & Metabolism Journal, *46*(1), 3-14. https://doi.org/10.4093/DMJ.2021.0335

Preda A., Pădureanu V., Moța M., Ștefan A. G., Comănescu A. C., Radu L., et al. (2021). Analysis of Maternal and Neonatal Complications in a Group of Patients with Gestational Diabetes Mellitus. Medicina 2021, Vol. 57, Page 1170, *57*(11), 1170. https://doi.org/10.3390/MEDICINA57111170

Chu A. H. Y., Yuan W. L., Loy S. L., Soh S. E., Bernard J. Y., Tint M. T., et al. (2021). Maternal height, gestational diabetes mellitus and pregnancy complications. Diabetes Research and Clinical Practice, *178*, 108978. https://doi.org/10.1016/J.DIABRES.2021.108978

Liu X., Wu N., & Al-Mureish A. (2021). A review on research progress in the application of glycosylated hemoglobin and glycated albumin in the screening and monitoring of gestational diabetes. International Journal of General Medicine, *14*, 1155-1165. https://doi.org/10.2147/IJGM.S296316

Quan Y., & Wang Y. (2025). Serum D-Dimer, Glycated Serum Protein, and HbA1c Levels in Predicting Macrosomia in Gestational Diabetes Mellitus. Diabetes, Metabolic Syndrome and Obesity , *18*, 2913-2921. https://doi.org/10.2147/DMSO.S530401

Tripathy S., Murugesan A., Natarajan K., Ramraj B., & Mohapatra S. (2022). Early screening biomarker HbA1c and Hematocrit for gestational diabetes mellitus. Clinical Epidemiology and Global Health, *13*, 100945. https://doi.org/10.1016/J.CEGH.2021.100945

Hannah W., Bhavadharini B., Beks H., Deepa M., Anjana R. M., Uma R., et al. (2022). Global burden of early pregnancy gestational diabetes mellitus (eGDM): A systematic review. Acta Diabetologica, *59*(3), 403-427. https://doi.org/10.1007/S00592-021-01800-Z/METRICS

Rajanna R., Muralidhar L., & Aswathreddy S. (2025). To Evaluate the Role of First-trimester Glycosylated Hemoglobin as an Early Biomarker for Gestational Diabetes Mellitus. International Journal of Infertility & Fetal Medicine, *15*(3), 153-156. https://doi.org/10.5005/JP-JOURNALS-10016-1361

Arbib N., Shmueli A., Salman L., Krispin E., Toledano Y., & Hadar E. (2019). First trimester glycosylated hemoglobin as a predictor of gestational diabetes mellitus. International Journal of Gynecology & Obstetrics, *145*(2), 158-163. https://doi.org/10.1002/IJGO.12794

Pei J., Wang B., & Wang D. (2022). Current Studies on Molecular Mechanisms of Insulin Resistance. Journal of Diabetes Research, *2022*(1), 1863429. https://doi.org/10.1155/2022/1863429

Karaçam Z., & Çelİk D. (2021). The prevalence and risk factors of gestational diabetes mellitus in Turkey: a systematic review and meta-analysis. The Journal of Maternal-Fetal & Neonatal Medicine, *34*(8), 1331-1341. https://doi.org/10.1080/14767058.2019.1635109

Kouhkan A., Najafi L., Malek M., Baradaran H. R., Hosseini R., Khajavi A., et al. (2021). Gestational diabetes mellitus: Major risk factors and pregnancy-related outcomes: A cohort study. International Journal of Reproductive Biomedicine, *19*(9), 827. https://doi.org/10.18502/IJRM.V19I9.9715

Çetin C., Güngör N. D., & Yavuz M. (2021). First trimester glycosylated hemoglobin for gestational diabetes mellitus screening. Taiwanese Journal of Obstetrics and Gynecology, *60*(5), 899-902. https://doi.org/10.1016/J.TJOG.2021.08.002

Wicklow B., & Retnakaran R. (2023). Gestational Diabetes Mellitus and Its Implications across the Life Span. Diabetes & Metabolism Journal, *47*(3), 333-344. https://doi.org/10.4093/DMJ.2022.0348

Amylidi S., Mosimann B., Stettler C., Fiedler G. M., Surbek D., & Raio L. (2016). First-trimester glycosylated hemoglobin in women at high risk for gestational diabetes. Acta Obstetricia et Gynecologica Scandinavica, *95*(1), 93-97. https://doi.org/10.1111/AOGS.12784

Valadan M., Bahramnezhad Z., Golshahi F., & Feizabad E. (2022). The role of first-trimester HbA1c in the early detection of gestational diabetes. BMC Pregnancy and Childbirth, *22*(1), 1-7. https://doi.org/10.1186/S12884-021-04330-2/TABLES/3

Sharma A. K., Singh S., Singh H., Mahajan D., Kolli P., Mandadapu G., et al. (2022). Deep Insight of the Pathophysiology of Gestational Diabetes Mellitus. Cells 2022, Vol. 11, Page 2672, *11*(17), 2672. https://doi.org/10.3390/CELLS11172672

Ray G. W., Zeng Q., Kusi P., Zhang H., Shao T., Yang T., et al. (2024). Genetic and inflammatory factors underlying gestational diabetes mellitus: a review. Frontiers in Endocrinology, *15*, 1399694. https://doi.org/10.3389/FENDO.2024.1399694/FULL

Sun J., Chai S., Zhao X., Yuan N., Du J., Liu Y., et al. (2021). Predictive Value of First-Trimester Glycosylated Hemoglobin Levels in Gestational Diabetes Mellitus: A Chinese Population Cohort Study. Journal of Diabetes Research, *2021*(1), 5537110. https://doi.org/10.1155/2021/5537110

Gojnic M., Todorovic J., Stanisavljevic D., Jotic A., Lukic L., Milicic T., et al. (2022). Maternal and Fetal Outcomes among Pregnant Women with Diabetes. International Journal of Environmental Research and Public Health 2022, Vol. 19, Page 3684, *19*(6), 3684. https://doi.org/10.3390/IJERPH19063684

Abera E. G., Gudina E. K., Gebremichael E. H., Sori D. A., & Yilma D. (2024). Double burden of gestational diabetes and pregnancy-induced hypertension in Ethiopia: A systematic review and meta-analysis of observational studies. PLOS ONE, *19*(10), e0311110. https://doi.org/10.1371/JOURNAL.PONE.0311110