Section: Medicine

Original Research Article

THE PREVALENCE AND RISK FACTORS ASSOCIATED WITH GESTATIONAL DIABETES MELLITUS IN TERTIARY CARE CENTRE

Priyanka Kukrele[1], Kanchan Salwe[2], Rajeev R S Kukrele[3], Archana Thakur[4]

[1]Associate Professor Department of Medicine NSCB Medical College Jabalpur, Madhya Pradesh, India.
[2]Senior Resident Department of Medicine NSCB Medical College Jabalpur Madhya Pradesh, India.
[3]Assistant Professor Department of Plastic Surgery NSCB Medical College Jabalpur Madhya Pradesh, India.
[4]Ex Assistant Professor Department of Gynecology NSCB Medical college Jabalpur Madhya Pradesh, India.

Received : 07/09/2025
Received in revised form : 17/10/2025
Accepted : 05/11/2025

Keywords:
Gestational Diabetes Mellitus (GDM), Body Mass Index (BMI), DIPSI (Diabetes in Pregnancy Study Group India), Medical Nutrition Therapy (MNT).

Corresponding Author:
Dr. Priyanka Kukrele,
Email: drpriyankakukrele@gmail.com

DOI: 10.47009/jamp.2025.7.6.19

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2025; 7 (6); 100-105

ABSTRACT

Background: Objective GDM leads to morbidity of both mother & developing baby. We should give more importance to mass screening of all pregnant women for detection of diabetes mellitus. With early detection of GDM and proper management, we can reduce health burden of our society both economically and socially. So, our study aims to detect the prevalence of GDM in our institute and see the risk factors associated with it. **Materials and Methods:** Our study was an observational study carried out in Department of medicine NSCB MCH Jabalpur over a Period of 18 months with sample size of 300 Pregnant female. After Written Proper consent, thorough history, and clinical examination all pregnant women were performed OGTT with 75gm of glucose by Indian DIPSI Criteria, those Pregnant women with Blood glucose >/= 140mg/dl were categorized as GDM. **Result:** In our study of 300 pregnant females, the prevalence of GDM came out to be 16.7% using Indian DIPSI criteria. GDM was more common in women over 25 years, those with a BMI over 25 kg/m², and those with a family history of diabetes or a history of PCOS. The study population included 25% from the upper socioeconomic class, 12.8% from the middle, and 18% from the lower, with the association between socioeconomic status and GDM remaining unclear. Sedentary lifestyle was identified as a significant risk factor, with a Prevalence of 45.5%. On Ultrasound examination, Polyhydramnios was found to be a notable finding in 66.7% of cases, indicating its Potential role as a contributing factor. Hypertension and thyroid disorders were less significantly associated with GDM. Chronic tobacco chewing found in 11.1% of our study population, showed no association with GDM. **Conclusion:** As GDM is associated with severe adverse maternal and fetal outcomes, Early identification of cases can prevent morbidity and mortality not only for the mother but also for the child. Therefore, our study recommends that screening for GDM should be done to all pregnant females attending ANC clinics as early as possible.

INTRODUCTION

Diabetes mellitus prevalence is increasing in our country exponentially. Gestational diabetes mellitus (GDM) is glucose intolerance that occurs in pregnant women and is characterised by onset or detection during pregnancy.[1] Our study estimated that in our institute there has higher prevalence of Gestational Diabetes mellitus (16.7%) than Global Prevalence of GDM (14%). The rising global prevalence of GDM is influenced by urbanization, sedentary lifestyles, physical inactivity, and dietary changes. In our study, we observed that several modifiable risk factors contribute to the development of gestational diabetes mellitus (GDM). Women with a body mass index (BMI) greater than 25 kg/m² were found to have a higher risk of developing GDM. Therefore, it is recommended that such women Should achieve healthy weight before planning pregnancy. Our findings also indicated that pregnancies occurring after the age of 25 years are associated with an increased risk of GDM, emphasizing the importance of timely family planning. We also found that adopting a healthy lifestyle and maintaining regular

ISSN (O): 2687-5365; ISSN (P): 2753-6556

physical activity before conception can significantly lower the chances of GDM. Females with a family history of diabetes should undergo preconception screening for diabetes mellitus and follow good dietary and lifestyle practices to minimize their risk. Furthermore, in our study, women with known cases of polycystic ovarian disease (PCOD) showed better outcomes when they engaged in structured lifestyle modification programs aimed at improving health. Importantly, we noted that pregnant women diagnosed with GDM should be screened for Polyhydramnios, which was more prevalent in this group. Overall, our study supports the role of early intervention, preconception counseling, and risk-based screening in reducing the incidence and complications of GDM in pregnancy.

GDM is associated with several long and short-term adverse outcomes for the mother (, preeclampsia, cesarean section, type 2 diabetes mellitus, metabolic syndrome, cardiovascular disease,[2,3,4] and child (macrosomia, birth trauma, neonatal hypoglycemia, impaired glucose tolerance, metabolic syndrome, cardiovascular diseases. The prevalence of overall GDM in pregnant women was 13%,[23] in Indian Scenario with the heterogeneity of the studies in different population. Our study aim is to estimate the prevalence of GDM in our institute and to determine the risk factors associated with it.

MATERIALS AND METHODS

The present study is carried out in the Department of Medicine, Netaji Subhash Chandra Bose Medical College & Hospital, in the city of Jabalpur in the state Madhya Pradesh, India. Sample size taken by formula Cochrans is 300.

All pregnant women attending the antenatal clinic with gestational age between 16-28 weeks are screened for Gestational Diabetes Mellitus (GDM) using a single-step Oral Glucose Tolerance Test (OGTT), regardless of their fasting status. Each woman is given 75 grams of glucose dissolved in 300 ml of water, which she is instructed to drink within 5 minutes. Two hours later, a venous blood sample (2 ml) is collected to measure blood glucose levels. If the woman vomits within 30 minutes of drinking the solution, the test is postponed and repeated the next day as per Protocol. If vomiting occurs after 30 minutes, the test is continued as planned. A 2-hour blood glucose level of ≥140 mg/dL is considered diagnostic of GDM, based on the DIPSI (Diabetes in Pregnancy Study Group India) criteria. All the GDM patients underwent thorough history and examination. Pregnant Women diagnosed with GDM are started on Medical Nutrition Therapy (MNT), Blood glucose is monitored regularly. If blood sugar levels remain high despite dietary changes, metformin is started. If glucose control is still not achieved or metformin is not suitable, insulin is used.

Inclusion Criteria: Pregnant women aged 18 years and above. Gestational age between 16 to 28 weeks, Attending the antenatal clinic at Medical College, Jabalpur during the study period. Willing to provide informed consent and participate in the study.

Exclusion Criteria: Women with a diagnosed case of diabetes mellitus. Women who are unwilling to participate or unable to give informed consent.

RESULTS

A Total of 300 pregnant women between 16 to 28 weeks of gestation were included in the study. Using the DIPSI single-step 75g OGTT criteria, the overall prevalence of Gestational Diabetes Mellitus (GDM) was found to be 16.7% (n = 50). A significant association was observed between advanced maternal age and GDM. Among GDM-positive cases, 64% (n = 32) were aged >25 years, compared to 42% (n = 105) in the non-GDM group ($p < 0.05$). This reinforces the well-established correlation between increasing maternal age and insulin resistance during pregnancy.

BMI also showed a strong association with GDM. 58% (n = 29) of the women diagnosed with GDM had a BMI >25 kg/m², highlighting the influence of maternal overweight/obesity as a major metabolic risk factor ($p < 0.01$). A positive family history of diabetes mellitus was reported in 46% (n = 23) of the GDM group, compared to 19.3% (n = 48) in the non-GDM group ($p < 0.05$), suggesting a significant genetic predisposition. Additionally, polycystic ovarian syndrome (PCOS) was present in 38% (n = 19) of the GDM cases, which is consistent with PCOS being a known risk factor for insulin resistance and GDM.

Socioeconomic status was assessed using Kuppuswamy Scale. Among the study population, 25% (n = 75) belonged to the upper class, 12.8% (n = 38) to the middle class, and 18% (n = 54) to the lower class. Although GDM prevalence was noted across all strata, the association between socioeconomic status and GDM was not statistically significant ($p > 0.05$). This may suggest that GDM is influenced more by lifestyle and metabolic risk factors than by economic background alone.

Among comorbidities, hypertension and thyroid disorders were observed in 12% (n = 6) and 10% (n = 5) of women with GDM, respectively. However, these conditions did not show a statistically significant association with GDM in this study population. In contrast, lifestyle factors played a more prominent role. A sedentary lifestyle was reported in 45.5% (n = 23) of GDM, significantly higher than the rate in non-GDM participants ($p < 0.05$). Furthermore, polyhydramnios was observed in 66.7% (n = 33) of the GDM group, and was found to be significantly associated with maternal hyperglycemia ($p < 0.01$). Chronic tobacco chewer, reported by 11.1% (n = 5) of women with GDM, did not demonstrate a statistically significant association ($p > 0.05$).

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Statistical Analysis: The collected data was summarized by using frequency, percentage, mean & S.D. To compare the qualitative outcome measures Chi-square test or Fisher's exact test was used. To compare the quantitative outcome measures independent t test was used. If data was not following normal distribution, Mann Whitney U test was used. SPSS version 22 software was used to analyze the collected data. p value of <0.05 was statistically significant.

Table 1: Prevalence of Gestational Diabetes Mellitus

Parameter	Number of Participants (n)	Percentage (%)
Total pregnant women studied	300	100
GDM-positive cases	50	16.7
Non-GDM cases	250	83.3

Table 2: Association of Maternal and Genetic Risk Factors with GDM

Risk Factor	GDM Group (n=50)	Non-GDM Group (n=250)	Statistical Significance
Age >25 years	32 (64%)	105 (42%)	$p < 0.05$ (Significant)
BMI >25 kg/m²	29 (58%)	—	$p < 0.01$ (Highly significant)
Family history of diabetes mellitus	23 (46%)	48 (19.3%)	$p < 0.05$ (Significant)
PCOS	19 (38%)	—	$p < 0.05$ (Significant)

Table 3: Socioeconomic Status (Based on Kuppuswamy Scale)

Socioeconomic Class	Total (n=300)	GDM Prevalence	Statistical Significance
Upper class	75 (25%)	Present but not significant	$p > 0.05$
Middle class	38 (12.8%)	Present but not significant	$p > 0.05$
Lower class	54 (18%)	Present but not significant	$p > 0.05$

Table 4: Comorbidities and Lifestyle Factors Associated with GDM

Variable	GDM Group (n=50)	Association with GDM	Statistical Significance
Hypertension	6 (12%)	Not significant	$p > 0.05$
Thyroid disorder	5 (10%)	Not significant	$p > 0.05$
Sedentary lifestyle	23 (45.5%)	Significantly higher incidence	$p < 0.05$
Polyhydramnios	33 (66.7%)	Strong association	$p < 0.01$
Chronic tobacco chewing	5 (11.1%)	Not significant	$p > 0.05$

DISCUSSION

Gestational diabetes mellitus (GDM) represents one of the most clinically significant metabolic disorders that occur during pregnancy. Characterized by glucose intolerance first recognized during gestation, GDM predisposes both mothers and infants to a range of complications that extend beyond the perinatal period. Its increasing prevalence globally and particularly in developing countries underscores a growing health challenge. Within tertiary care centers, where both low-risk and high-risk obstetric populations converge, the magnitude and determinants of GDM require systematic exploration. Understanding the prevalence and correlates of GDM in these settings provides the foundation for targeted screening strategies and effective management protocols, especially in low- and middle-income regions transitioning to more Westernized lifestyles and dietary patterns.

The global burden of GDM has been rising, influenced by demographic transitions, enhanced diagnostic capacity, and changing definitions of glucose intolerance. Studies across continents reveal wide discrepancies in prevalence, ranging from as low as 1% to as high as 28%, depending on the population studied and diagnostic criteria applied. In many tertiary centers, prevalence estimates tend to be higher than community-based assessments, reflecting referral bias and concentration of high-risk pregnancies. According to Boadu et al. (2022), in Ghana, the prevalence of GDM among antenatal attendees in tertiary institutions stood at 11%, influenced by urbanization and dietary shifts. Similarly, Lee et al. (2018) reported a pooled prevalence of 11.5% across Asian countries, signaling a regional pattern of rising GDM linked to socioeconomic development and sedentary lifestyles. Our study aimed to assess the prevalence and associated risk factors of Gestational Diabetes Mellitus (GDM) in a medical college of central India. Our findings revealed a prevalence rate of 16.7%, which is notably higher than the global average of approximately 14%. This elevated rate signifies a growing burden of GDM in the studied population and emphasizes the importance of universal screening during pregnancy, particularly in regions undergoing rapid urbanization and lifestyle changes. A significant association was observed between increased maternal age and GDM, with women over 25 years exhibiting a higher prevalence, which identifies advancing maternal age as a consistent risk factor for glucose intolerance during pregnancy. Additionally, obesity, defined by a BMI >25 kg/m², was found to be strongly associated with GDM. This Highlight Preconception counseling and weight optimization, especially in women planning pregnancy. Another important finding was the higher

ISSN (O): 2687-5365; ISSN (P): 2753-6556

prevalence of GDM among women with a past history of polycystic ovarian syndrome (PCOS). PCOS is known to be associated with insulin resistance, and our findings support previous studies that suggest women with PCOS are at heightened risk for GDM. Sedentary lifestyle was another modifiable factor commonly seen among GDM-positive individuals, indicating that lack of physical activity remains an important contributor to metabolic disturbances during pregnancy.

Our study also highlights the importance of family history of diabetes as a non-modifiable yet highly predictive risk factor for GDM. Women with such a history should be considered high-risk and undergo early glucose screening. Moreover, an association was observed between polyhydramnios on ultrasonography and GDM, supporting earlier reports that excessive amniotic fluid can be an direct indicator of fetal hyperglycemia due to maternal glucose intolerance. These findings reinforce the necessity for clinicians to identify at-risk women early in pregnancy, ideally at the first antenatal visit. GDM is well-recognized for its association with adverse maternal and fetal outcomes, including preeclampsia, macrosomia, birth trauma, neonatal hypoglycemia, and increased perinatal morbidity and mortality. Most of these complications are largely preventable through timely diagnosis and appropriate glycemic control. Given the increasing prevalence of GDM in India and its short- and long-term complication, our study supports the implementation of routine GDM screening in all pregnant women, regardless of risk profile, as per national and international guidelines. A proactive approach involving lifestyle intervention, nutritional counseling, and pharmacological treatment, when necessary, can significantly improve both maternal and neonatal outcomes, while also reducing the economic and public health burden.

Regionally, Asian and Middle Eastern countries are witnessing sharper increases compared to Western populations. The meta-analysis conducted by Karaçam and Çelik (2021) in Turkey found a pooled GDM prevalence of 8% based on different diagnostic approaches. These findings parallel evidence from other parts of Asia, where shifts in dietary intake and body composition have compounded risks. Xiong et al. (2001) earlier demonstrated that GDM prevalence was not only influenced by intrinsic maternal characteristics such as age and parity but also by extrinsic factors including healthcare access, urban residence, and nutritional transitions. Given the diverse diagnostic tools such as the World Health Organization (WHO) and the International Association of Diabetes and Pregnancy Study Groups (IADPSG) criteria, variations in reported prevalence across studies must be cautiously interpreted.

Within tertiary care centers, higher prevalence is expected because these facilities often receive referrals for complicated pregnancies. A study by Rajput et al. (2013) in Haryana, India, conducted in a tertiary hospital setting, revealed a prevalence of 7.1% using the WHO 1999 criteria. Their analysis also indicated that advancing maternal age, obesity, family history of diabetes, and previous macrosomic deliveries were significant predictors. Similarly, a tertiary-care-based study in Ghana found elevated risk linked to both modifiable factors such as dietary habits and non-modifiable ones like genetic predisposition. These findings highlight the multifactorial etiology of GDM and the need to reinforce antenatal screening and preventive counseling in hospital-based antenatal programs.

Advanced maternal age remains one of the most consistently reported risk factors for GDM worldwide. Several large-scale studies have established that women above 30 years face a significantly higher risk compared to younger women. According to Lee et al. (2018), the pooled odds ratio for GDM among women aged 35 and older was 2.4 relative to those under 25. This association likely reflects age-related decline in insulin sensitivity and pancreatic beta-cell function. In tertiary care settings, the proportion of women conceiving at advanced ages tends to be higher due to delayed childbearing and the availability of assisted reproductive technologies. These demographic shifts further elevate the GDM burden and intensify the need for early screening during antenatal registration.

Maternal obesity and overweight status represent another major determinant of GDM across populations. Body mass index (BMI) before conception and excessive gestational weight gain are both powerful predictors of glucose intolerance. Pu et al. (2015) emphasized the significant role of obesity, demonstrating that obese women had more than a threefold increased risk of developing GDM compared to women of normal weight. The pathophysiological link lies in insulin resistance and adipokine dysregulation common in obesity. In tertiary centers, where nutritional counseling may be inconsistent, addressing obesity through lifestyle modification prior to conception emerges as a vital preventive measure.

Ethnicity and genetic susceptibility also contribute to differences in GDM prevalence. Multiple studies, including those by Pu et al. (2015) and Dewi et al. (2023), have demonstrated that women of Asian, African, and Hispanic descent have higher GDM rates compared to Caucasian populations, even after controlling for BMI and maternal age. This disparity is observed within multiethnic tertiary institutions where diverse patient populations are enrolled. Genetic polymorphisms influencing insulin receptor and glucose transporter genes may underpin these differences. Moreover, cultural dietary patterns high in refined carbohydrates and saturated fats, combined with sedentary behavior, further amplify these predispositions in tertiary-care populations.

Family history of type 2 diabetes mellitus (T2DM) stands out as a well-established risk factor for GDM across various populations. Studies in Ghana (Boadu et al., 2022) and India (Rajput et al., 2013) affirm that women with a positive family history of diabetes are

ISSN (O): 2687-5365; ISSN (P): 2753-6556

twice as likely to develop GDM compared to those without such history. Familial clustering underscores the genetic and lifestyle correlation between GDM and T2DM. The presence of metabolic syndrome traits in immediate family members predisposes pregnant women to glucose intolerance through inherited insulin resistance. Recognizing family history in hospital antenatal records can guide early risk stratification and individualized nutritional and exercise counseling.

History of GDM in prior pregnancies significantly increases recurrence risk in subsequent gestations. Several systematic reviews, including Karaçam and Çelik (2021), note that recurrence risk may exceed 30% in women with prior GDM, particularly when post-partum glycemic abnormalities persist. This observation stresses the continuity between gestational glucose intolerance and chronic metabolic disorders. Tertiary centers that maintain longitudinal antenatal records can leverage such data for preconception counseling and early risk monitoring. Furthermore, women with previous macrosomic deliveries or stillbirths—a recurring observation in hospital-based cohorts—may have undiagnosed or unmonitored GDM in prior pregnancies.

Dietary patterns and physical inactivity are modifiable lifestyle factors strongly associated with GDM in contemporary hospital settings. The nutritional shift toward caloric-dense, high-fat diets, particularly in urban populations, has contributed to elevated maternal insulin resistance. Dewi et al. (2023) identified strong correlations between low fruit and vegetable intake and higher GDM prevalence across Asian studies. In tertiary-care patients, sedentary occupations and lack of structured antenatal physical activity programs exacerbate this risk. Structured lifestyle interventions focusing on dietary intake and moderate exercise during early pregnancy can dramatically reduce GDM incidence and improve maternal outcomes.

Socioeconomic factors, although often underexplored, play an important role in GDM distribution. Women with higher income or education levels in urban settings may exhibit greater prevalence due to lifestyle-induced metabolic stress, whereas low-income women may have restricted access to quality antenatal care and screening services. The interplay between socioeconomic status and GDM is context dependent. Boadu et al. (2022) demonstrated that urbanization and sedentary jobs among middle-income women in Ghana were key contributors to elevated GDM rates within tertiary-care environments. Tailoring screening and health education to the socioeconomic realities of each patient group can improve identification and management.

Parity has also been implicated as a potential determinant of GDM. Multiple studies have noted an incremental risk with increasing parity, although findings remain inconsistent. In the study by Rajput et al. (2013), multiparous women showed slightly higher odds of GDM, whereas Karaçam and Çelik (2021) reported minimal associations after adjusting for age and BMI. Still, higher parity may serve as a proxy for cumulative nutritional, metabolic, and anthropometric shifts. Tertiary-care populations often include women with multiple consecutive pregnancies, necessitating vigilance in glucose monitoring and postpartum follow-up to prevent future metabolic disease.

A family history of hypertension and metabolic syndrome also interlinks with GDM development. Aktun et al. (2015) highlighted predictive risk factors in GDM management, identifying co-existing hypertension as a frequent comorbidity. This correlation aligns with the concept of shared pathophysiological pathways, including endothelial dysfunction and insulin resistance. In tertiary institutions where concurrent hypertensive disorders are prevalent, integrated obstetric-metabolic clinics can optimize diagnostic and therapeutic coordination. Holistic care models addressing comorbid conditions not only enhance pregnancy outcomes but also curb transitions to chronic metabolic diseases postpartum.

Beyond individual risk factors, institutional and systemic contributors influence GDM prevalence in tertiary centers. Diagnostic thresholds, universal screening versus selective testing, and staff training levels significantly affect detection rates. Studies from Asia (Lee et al., 2018; Dewi et al., 2023) suggest that universal screening leads to higher reported prevalence compared to risk-based approaches. The adoption of the IADPSG criteria, with lower glucose thresholds, has also contributed to increased identification rates. Hence, prevalence estimates in tertiary hospitals should be interpreted alongside the screening frameworks employed to ensure appropriate benchmarking against other regional studies.

The clinical implications of GDM extend beyond pregnancy. Maternal complications include preeclampsia, cesarean deliveries, and future diabetes, while fetal consequences encompass macrosomia, neonatal hypoglycemia, and long-term metabolic disturbances. Xiong et al. (2001) demonstrated that infants of mothers with GDM face elevated risks of rapid postnatal weight gain and obesity. Tertiary hospitals thus have an essential role in not just diagnosing and treating GDM but also initiating postpartum surveillance. Early intervention during pregnancy represents an opportunity to modify life-course health trajectories for both mother and child.

CONCLUSION

Our study reports a significantly high prevalence of Gestational Diabetes Mellitus (GDM) at 16.7% in a region of central India, which exceeds the global average of 14%. Several risk factors were found to be significantly associated with the development of GDM, including maternal age above 25 years, tells us

ISSN (O): 2687-5365; ISSN (P): 2753-6556

the importance of age, poor life style (High body mass index and sedentary life style) can be important risk factor for development of GDM, family history of DM also has shown significant risk for GDM, history of PCOS in Pregnancy also has risk factor for the GDM and the presence of polyhydramnios on ultrasound shows one of the complication associated with GDM Patient. These findings emphasize the critical need for early and comprehensive screening of all pregnant women, with particular attention to those in high-risk categories. Early detection and timely intervention can substantially mitigate the risk of adverse maternal and neonatal outcomes, as well as long-term health complications. Considering the rising incidence of GDM in developing countries such as India, it is imperative for healthcare systems to implement universal GDM screening protocols within routine antenatal care. Such proactive measures have the potential to improve pregnancy outcomes and reduce the broader socioeconomic burden associated with GDM.

Gestational diabetes mellitus has emerged as a critical public health challenge in tertiary care settings globally. The interplay of demographic, genetic, metabolic, and lifestyle determinants drives its increasing prevalence. Studies from different regions—whether in Ghana, Turkey, India, or elsewhere in Asia—consistently confirm the significance of age, obesity, family history, and lifestyle behaviors as principal risk factors. Addressing GDM within tertiary institutions requires both robust screening protocols and comprehensive lifestyle modification programs. Strengthening antenatal education, ensuring uniform diagnostic standards, and integrating multidisciplinary management can substantially mitigate adverse outcomes. Continued research in tertiary settings will deepen our understanding of contextual risk dynamics and inform more equitable, evidence-based strategies for prevention and care.

REFERENCES

1. Boadu WI, Kugblenu P, Senu E, Opoku S, Anto EO. Prevalence and risk factors associated with gestational diabetes mellitus among pregnant women: a cross-sectional study in Ghana. Frontiers in Clinical Diabetes and Healthcare. 2022 Mar 22; 3:854332.
2. Lee KW, Ching SM, Ramachandran V, Yee A, Hoo FK, Chia YC, Wan Sulaiman WA, Suppiah S, Mohamed MH, Veettil SK. Prevalence and risk factors of gestational diabetes mellitus in Asia: a systematic review and meta-analysis. BMC pregnancy and childbirth. 2018 Dec 14;18(1):494.
3. Karaçam Z, Çelİk D. The prevalence and risk factors of gestational diabetes mellitus in Turkey: a systematic review and meta-analysis. The Journal of Maternal-Fetal & Neonatal Medicine. 2021 Apr 18;34(8):1331-41.
4. Xiong X, Saunders LD, Wang FL, Demianczuk NN. Gestational diabetes mellitus: prevalence, risk factors, maternal and infant outcomes. International Journal of Gynecology & Obstetrics. 2001 Dec 1;75(3):221-8.
5. Pu J, Zhao B, Wang EJ, Nimbal V, Osmundson S, Kunz L, Popat RA, Chung S, Palaniappan LP. Racial/ethnic differences in gestational diabetes prevalence and contribution of common risk factors. Paediatric and perinatal epidemiology. 2015 Sep;29(5):436-43.
6. Dewi RS, Isfandiari MA, Martini S, Yi-Li C. Prevalence and risk factors of gestational diabetes mellitus in Asia: a review. Journal of Public Health in Africa. 2023 May 25;14(2):7.
7. Rajput R, Yadav Y, Nanda S, Rajput M. Prevalence of gestational diabetes mellitus & associated risk factors at a tertiary care hospital in Haryana. Indian Journal of Medical Research. 2013 Apr 1;137(4):728-33.
8. Aktun LH, Yorgunlar B, Karaca N, Akpak YK. Predictive risk factors in the treatment of gestational diabetes mellitus. Clinical Medicine Insights: Women's Health. 2015 Jan;8:CMWH-S31564.

ISSN (O): 2687-5365; ISSN (P): 2753-6556