

EARLY DETECTION OF GESTATIONAL DIABETES AND ITS IMPACT*Dusmurodova Madinabonu Olimjon kizi**Residency: Republican Perinatal Center 2 years*Dusmurodovamadina@gmail.com

Annotation: Gestational Diabetes Mellitus (GDM) is a significant pregnancy-related condition characterized by glucose intolerance with onset or first recognition during pregnancy. Early detection of GDM is crucial for preventing adverse maternal and neonatal outcomes, such as preeclampsia, macrosomia, and neonatal hypoglycemia. This article reviews both international and Uzbek clinical research on early screening methods, including fasting plasma glucose, oral glucose tolerance tests (OGTT), and emerging biochemical markers like homocysteine and leptin. Findings show that early diagnosis, especially before 24 weeks of gestation, allows for timely intervention and improved perinatal outcomes. Uzbek studies underscore the importance of adapting national screening protocols to include high-risk assessments and earlier diagnostic testing. The article concludes by highlighting the need for increased awareness, healthcare professional training, and access to testing services in Uzbekistan.

Keywords: Gestational diabetes mellitus, early detection, maternal outcomes, neonatal outcomes, OGTT, biochemical markers, Uzbekistan, pregnancy screening, homocysteine, leptin

Introduction

(GDM) is a form of glucose intolerance that is first recognized during pregnancy, typically in the second or third trimester. It affects approximately 7–14% of pregnancies globally, and recent studies suggest its incidence is rising, especially in low- and middle-income countries such as Uzbekistan due to lifestyle changes, rising obesity, and delayed maternal age. Despite often being asymptomatic, GDM poses serious risks to both maternal and neonatal health if not diagnosed and managed in a timely manner.

The pathophysiology of GDM is largely attributed to hormonal changes during pregnancy that induce insulin resistance. In women with limited pancreatic β -cell compensation, this leads to hyperglycemia. If left untreated, GDM can result in complications such as macrosomia, birth trauma, neonatal hypoglycemia, preeclampsia, polyhydramnios, and a higher likelihood of cesarean section. Long-term, both the mother and child are at increased risk of developing type 2 diabetes mellitus and cardiovascular disease. Early detection of GDM plays a pivotal role in minimizing these adverse outcomes. While standard screening protocols often recommend glucose testing between 24–28 weeks of gestation, recent research—especially from Central Asia including Uzbekistan—suggests that earlier testing may provide better maternal-fetal outcomes. Studies conducted in Uzbekistan have explored the effectiveness of early screening using fasting glucose levels, oral glucose tolerance tests (OGTT), and emerging biochemical markers such as homocysteine and leptin.

The importance of early diagnosis has gained further attention during the COVID-19 pandemic, where limited access to routine antenatal care services led researchers to explore simplified, accessible, and

earlier diagnostic strategies. Uzbek researchers like Karimova G.K. and Faizullaeva M. have contributed significantly by providing region-specific data, highlighting the need for contextualized approaches in diagnosing and managing GDM.

Study Design and Setting

This study is a narrative review supplemented with selected empirical data from recent clinical research conducted in Uzbekistan between 2020 and 2024. The focus was placed on evaluating early diagnostic strategies for Gestational Diabetes Mellitus (GDM) and their effectiveness in improving maternal and neonatal outcomes. The data were derived from clinical trials, observational cohort studies, and retrospective analyses published in peer-reviewed journals and medical bulletins within Uzbekistan.

Inclusion Criteria

Studies included in this review met the following criteria:

- Conducted in Uzbekistan or included Uzbek population samples;
- Focused on early detection (before 24 weeks gestation) of GDM;
- Evaluated diagnostic methods such as fasting plasma glucose (FPG), oral glucose tolerance test (OGTT), and/or biochemical markers (e.g., homocysteine, leptin);
- Reported maternal and/or neonatal outcomes.

Data Collection and Analysis

A structured search was conducted using electronic databases including Google Scholar, PubMed, and regional medical journal repositories (e.g., *Central Asian Journal of Medical and Natural Sciences*, *Western European Journal of Experimental Studies*). Key search terms included: *Gestational Diabetes*, *early screening*, *Uzbekistan*, *homocysteine*, *OGTT*, and *maternal outcomes*.

From the Uzbek literature, three primary clinical studies were selected for detailed analysis:

1. A prospective study by Karimova et al. (2021), assessing biochemical markers in early pregnancy among 104 women (GDM group and control);
2. A retrospective cohort by Faizullaeva et al. (2024), comparing perinatal outcomes in 600 women screened using different diagnostic protocols;
3. A cross-sectional study by Khalimova et al. (2020), analyzing GDM prevalence and related complications in over 1,800 pregnant women.

Data from these studies were extracted into comparative tables, and descriptive statistics were used to summarize trends in diagnosis timing and outcomes. No statistical meta-analysis was conducted due to variability in study designs.

Ethical Considerations

All referenced studies received approval from relevant institutional ethics committees, such as those of Samarkand State Medical University and the Tashkent Medical Academy. Patient consent was obtained in the original studies where applicable.

Early detection of Gestational Diabetes Mellitus (GDM) plays a crucial role in reducing the risk of both short-term and long-term complications for mothers and their babies. International studies consistently demonstrate that identifying glucose intolerance during the early stages of pregnancy allows for timely intervention, which can significantly improve maternal metabolic control and fetal development. This review highlights that similar patterns are observed in clinical research conducted in Uzbekistan, where early screening has been associated with improved perinatal outcomes and a reduction in complications such as preeclampsia, macrosomia, and neonatal hypoglycemia.

Uzbek researchers have particularly emphasized the usefulness of biochemical markers like homocysteine and leptin, alongside standard glucose testing methods. These early markers offer potential for diagnosis even before the commonly recommended 24–28 weeks, especially in high-risk populations. Their findings suggest that anemia and metabolic syndrome indicators may serve as early warning signs for the development of GDM. Moreover, these studies advocate for routine early OGTT (Oral Glucose Tolerance Test) screening in women with risk factors, such as obesity, family history of diabetes, or previous GDM. The research also underscores that early detection alone is not sufficient without appropriate and timely management. In the Uzbek context, implementation of updated treatment protocols, patient education, nutritional counseling, and in some cases insulin therapy, have led to better maternal glycemic control and decreased the rates of adverse delivery outcomes. However, disparities in access to diagnostic tools and prenatal care in rural regions remain a significant challenge. Another key point is the importance of awareness and training among healthcare professionals. Many cases of GDM are missed or diagnosed late due to insufficient screening practices or lack of follow-up. To address this, Uzbek health institutions have initiated updates to national guidelines that align with international standards, recommending screening in the first trimester for at-risk women.

Conclusion

The early detection of Gestational Diabetes Mellitus (GDM) is a key component in ensuring safe pregnancy outcomes and preventing complications for both mothers and their newborns. Timely identification of GDM allows healthcare providers to implement lifestyle modifications, dietary interventions, and, when necessary, pharmacological treatment to control blood glucose levels effectively. This approach significantly reduces the incidence of adverse outcomes such as preeclampsia, fetal macrosomia, neonatal hypoglycemia, and unnecessary cesarean deliveries.

Findings from both international literature and Uzbek clinical studies support the benefits of introducing screening protocols during the first trimester, especially for women with identifiable risk factors. In Uzbekistan, promising results have been achieved using not only traditional glucose tests such as the Oral Glucose Tolerance Test (OGTT) but also biochemical markers like homocysteine and leptin, which have shown potential in detecting metabolic disturbances even before hyperglycemia becomes clinically apparent.

Incorporating early diagnostic strategies into national healthcare practices requires increased awareness, medical staff training, and better access to screening services, especially in rural areas. The

adoption of unified, evidence-based guidelines will improve consistency in diagnosis and management of GDM across different regions of the country.

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