



Gestational Diabetes Mellitus
AADE Practice Synopsis
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Gestational diabetes mellitus (GDM), a condition characterized by glucose intolerance during pregnancy, is associated with a variety of adverse birth outcomes, including excessive fetal weight gain and related increases in the rate of cesarean delivery and perinatal injury. GDM increases the risk for a number of longer-term adverse outcomes, including progression to type 2 diabetes (T2D) in the mother as well as increased risk of obesity, diabetes, and possibly adult cardiovascular disease in the infant.¹

Non-pharmacologic medical nutrition therapy, including dietary changes, meal planning, and increased physical activity, is recognized as the cornerstone of treatment for GDM.² Insight about engaging in these self-care behaviors can be effectively delivered by diabetes educators, who play a critical and unique role in supporting the pregnant woman with GDM to facilitate optimal glycemic control.

Detection and Diagnosis of GDM

A growing body of evidence suggests that elevated blood glucose levels during pregnancy may contribute to worse birth outcomes even at levels that until recently were considered normal.³ These data have prompted new guidelines from the American Diabetes Association (ADA) that advocate universal screening for GDM using less stringent diagnostic criteria than have been used in the past.⁴

The current screening guidelines are:⁵

- Screen for undiagnosed type 2 diabetes at the first prenatal visit in those with risk factors, using standard diagnostic criteria.
- Screen women with GDM for persistent diabetes at 6–12 weeks postpartum, using OGTT, nonpregnancy diagnostic criteria.
- Women with a history of GDM should have lifelong screening for the development of diabetes or prediabetes at least every 3 years.

The new guidelines are based in large part on findings from the Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) study³ and stipulate that an abnormal value for a 75-g OGTT (when the test is performed in the morning after an overnight fast of at least 8 hours) at 24-28 weeks of gestation at any of the three diagnostic cut points (Table 1) measurements is sufficient to make the diagnosis of GDM. It is estimated that implementing these guidelines will increase prevalence of GDM more than 2-fold, from around 7% currently to an estimated 17.8%.⁶ This enormous increase in the number of patients with GDM presents diabetes educators and the entire health care team with tremendous opportunities and challenges.

Table 1

Glucose Measure	Glucose concentration threshold - mg/dl	Glucose concentration threshold - mmol/l
Fasting plasma glucose	≥92	≥5.1
1-h plasma glucose	≥180	≥10.0
2-h plasma glucose	≥153	≥8.5

Some professional groups, such as the American Congress of Obstetricians and Gynecologists (ACOG),⁷ have not endorsed these new diagnostic criteria. This can result in confusion regarding the pregnant woman's clinical status and treatment plan. ACOG notes that while the results of the HAPO observational study show an association between mild hyperglycemia and adverse outcomes, they do not demonstrate the clinical benefits of treating women diagnosed using these criteria. This raises questions about the healthcare costs associated with this significant change in practice, as well as possible harms that might result from identifying more women with GDM (e.g. via an increase in obstetrical procedures). Reaching consensus on the optimal diagnostic criteria for GDM is a critical focus of research in this area, though beyond the scope of work for the diabetes educator.

Although obesity contributes to the rising prevalence of diabetes during pregnancy,^{8,9} not all women with GDM are overweight. Insulin resistance during pregnancy is a physiologic phenomenon driven by the metabolic demands of the maternal-fetal unit, stress and pregnancy-induced hormonal changes, and

these changes occur in women of any size. Approximately 30% of women with GDM are normal weight at conception, and 70% are overweight or obese.⁸

Treatment of GDM

The benefits of treating mildly elevated blood glucose are supported by the results of two large randomized controlled trials conducted in Australia¹⁰ and the United States.¹¹ The vast majority of women (80% to 90%) in these trials were managed solely with meal planning and lifestyle changes. The results showed that women receiving treatment had a reduction in birth weights, lower frequency of large-for-gestational age births, and less preeclampsia compared with women receiving usual care.

Although it is clear that nutrition-based interventions are effective for GDM, there is little evidence to guide decisions about the optimal energy or macronutrient content of diets for women with GDM.¹² The Institute of Medicine (IOM)¹³ recommends weight gain of 25 to 35 lbs for normal-weight women (BMI 18.5 to 24.9); 15 to 25 lbs for women who are overweight (BMI 25 to 29.9); and 11 to 20 lbs for women who are obese (BMI \geq 30). These recommendations, however, are not directed specifically to women with GDM. Some experts recommend weight gain of 0-7 lbs for obese women with GDM, citing data showing reduced risk of macrosomia at this level of weight gain.¹⁴

Many organizations recommend moderate physical activity, including brisk walking or arm exercises while seated in a chair, as part of the treatment program for women with GDM who are capable of participating.^{15,16} These recommendations are based on small studies suggesting that exercise lowers fasting and postprandial glucose concentrations and may reduce the number of women with GDM requiring insulin therapy. Although 30 minutes per day of activity is recommended, there is currently not enough evidence to determine the appropriate duration, frequency, intensity, or type of exercise to perform for optimal outcomes.

Women with GDM who performed self-monitoring of blood glucose (SMBG) showed lower rates of macrosomia compared with women with GDM who did only weekly office testing of blood glucose levels.¹⁷ Most experts recommend conducting SMBG daily upon waking and at 1- or 2-hour intervals after meals.¹⁸ The goal of GDM treatment is to maintain blood glucose at levels that will minimize risk of adverse perinatal outcomes, but there are no evidence-based cutoffs at which benefits of treatment clearly outweigh harms. Existing consensus recommendations include targets of \leq 95 mg/dL for fasting glucose, \leq 140 mg/dL for one-hour postprandial measurements, and \leq 120 mg/dL for two-hour

postprandial measurements.¹⁶ Although many clinicians decrease the frequency of SMBG in women with well-controlled GDM, it is not clear how to identify women who can safely decrease monitoring frequency without affecting outcomes.

If nutrition care and increased physical activity fail to maintain adequate glucose control, treatment should be intensified to include pharmacologic therapy by an appropriate health professional. Insulin is the first-line treatment in GDM,¹⁸ and the insulin regimen should be individualized to meet glycemic targets.¹⁶ There is growing interest in the use of oral antidiabetic agents,¹⁹ including glyburide and metformin, because of increased convenience and potential cost savings. Based on favorable clinical trial data and evidence that it has minimal transfer across the placenta, glyburide is recommended by some experts as an alternative for women who are unable or unwilling to take insulin.^{19,20} However as of November 2013, none of the oral agents is FDA approved for use in pregnancy.

Postpregnancy Management

GDM is increasingly recognized as a general risk factor for the development of T2D. According to a systematic review of studies, up to 60% of women with GDM had progressed to T2D during 10 years of post-pregnancy follow-up.²¹ Although the majority of women with GDM will be normoglycemic in the immediate postpartum period, studies suggest that 11% to 33% will display evidence of impaired glucose tolerance, and 1% to 8% will have frank diabetes, at 6 to 12 weeks postdelivery.²² In many cases, these individuals likely had some degree of glucose intolerance, pre-diabetes or even undiagnosed T2D, that preceded the pregnancy, but their condition was not recognized until the postpartum screen. Even when postpartum glucose levels are within normal limits, women with a history of GDM are at much higher risk of developing GDM in subsequent pregnancies.²³

Guidelines advocate careful postpregnancy surveillance to monitor for T2D. Screening for impaired glucose tolerance is recommended at 6 to 12 weeks following delivery and then at a minimum of every 3

years thereafter.⁴ Despite this guidance, evidence indicates that only half of women with GDM receive appropriate post-partum screening for T2D in most populations.²⁴ Barriers to screening may be patient-related (e.g. lack of awareness regarding risk status), provider-related (e.g. uncertainty regarding recommended screening intervals) or system-related (e.g. lack of communication between obstetric and postpartum providers, or limited access to the health care system).²⁵

The American Diabetes Association further recommends that women with a history of GDM found to have prediabetes should receive lifestyle interventions or metformin to prevent diabetes.²⁶

Diabetes educators have the potential to play a vitally important role in addressing these barriers, both through the education of patients and providers and by serving as a bridge between the prenatal and postnatal care teams.²⁶

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