Academy of Nutrition and Dietetics Gestational Diabetes Evidence-Based Nutrition Practice Guideline

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GESTATIONAL DIABETES MELLITUS (GDM) is a common perinatal complication characterized by glucose intolerance that develops during pregnancy.[1,2] The American Diabetes Association (ADA) defines GDM as "diabetes diagnosed in the second or third trimester of pregnancy that was not clearly overt diabetes prior to gestation."[3]

The exact prevalence of GDM is unknown.[4] In 2010, GDM prevalence in the United States was estimated to be 4.6% to 9.2%.[4] However, not all experts agree on the criteria to diagnose GDM and the estimated incidence of GDM depends on the population, the diagnostic criteria used, and the source of the data.[1,3] Over the past few decades, GDM rates have risen in the same trend as the rates of obesity and type 2 diabetes mellitus.[1]

A number of factors increase the risk for developing GDM. These include older maternal age (>30 years); body mass index (BMI) >25; past history of GDM; a first-degree relative with diabetes; and women of Hispanic, African American, Native American, South or East Asian, or Pacific Island descent.[1,2]

GDM poses risks to both the mother and baby. Pregnant women with GDM are at increased risk for preeclampsia and caesarean section. Infants are at risk for fetal macrosomia (which can cause shoulder dystocia and birth injury), and neonatal hypoglycemia. GDM also predisposes the infant to childhood obesity, and the mother to development of type 2 diabetes.[3,5,6] Obese women with GDM carry an even greater risk for adverse outcomes during pregnancy, compared with either GDM or obesity alone.[5]

Medical nutrition therapy (MNT) and physical activity are the first-line treatment of GDM. In some women, pharmacologic therapy may be added.[3,7] The goal of MNT is to encourage a healthful diet to achieve and maintain normoglycemia and promote appropriate pregnancy weight gain and adequate fetal growth.[8] Frequent glucose monitoring and ketone testing are recommended to provide feedback about day-to-day control and to make treatment adjustments.[8] Efforts are aimed at reducing perinatal and postpartum complications.

During 2008, the Academy of Nutrition and Dietetics (Academy) published its first GDM Evidence-Based Nutrition Practice Guideline (EBNPG) on the Evidence Analysis Library (EAL) online (www.andeal.org). According to the Academy, "EBNPGs are a series of guiding statements that are developed using a systematic process for identifying, analyzing, and synthesizing scientific evidence."[9] EBNPGs provide timely and comprehensive guidance to assist registered dietitian nutritionists (RDNs) in decisions about appropriate nutrition care for their patients. During 2013, a new evidence analysis work group was formed to update the original EBNPG and was subsequently published as part of the EAL during January 2017. This publication outlines the methods used to complete the systematic review (SR) and guideline and examines the guideline recommendations and supporting evidence.

The GDM EBNPG provides the latest, evidence-based summary of effective practice in the nutrition management of women with GDM. Principal areas include MNT, calories, macronutrients and micronutrients, dietary patterns, distribution of meals and snacks, high-intensity sweeteners, exercise, and alcohol. Using the Nutrition Care Process (NCP)[10] as a framework for practice, these recommendations begin with a referral to an RDN for MNT and follow with individualized nutrition assessment, intervention, and monitoring and evaluation (M&E). Implementation of these evidence-based nutrition practice recommendations will assist RDNs and other clinicians in improving maternal and fetal/neonatal outcomes in women with GDM.

GUIDELINE METHODOLOGY

Six volunteers with extensive experience in GDM nutrition practice and/or research were appointed to the expert work group in 2013 by the Academy's Evidence-Based Practice Committee. The work group was assisted by an Academy project manager, a lead analyst, and nine evidence analysts. As the work progressed, the scope and complexity of the evidence analysis required the addition of a consultant and a co-lead analyst to the project team. The work group followed the Academy evidence analysis methodology for conducting SRs and developing guidelines.[9,11] All work group business was conducted via conference calls and through a shared online work environment.

Based on the landscape of available evidence, current GDM nutrition practices, and the needs of practitioners, the work group developed 12 guiding questions for SRs under the following topics: effectiveness of MNT for treatment and prevention of GDM; effect of varying levels of calorie consumption;

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influence of amount and type of carbohydrate (CHO), protein, and fat consumption; effect of dietary patterns based on Dietary Approaches to Stop Hypertension (DASH) and the Glycemic Index (GI); and influence of distribution of meals and snacks. Outcomes of interest were identified as glycemic control; maternal weight gain; fetal growth/birth weight; and adverse fetal, maternal, and neonatal outcomes.

The work group provided parameters and inclusion/exclusion criteria for a systematic search of the scientific literature using the PubMed database (Figure 1). The dates encompassed by the search were January 2000 to August 2015. Studies published in English in peer-reviewed journals were eligible for inclusion. The search focused on pregnant adult women aged ≥19 years diagnosed with GDM (with or without insulin therapy). Study design preferences were randomized controlled trials (RCTs), large nonrandomized observational studies, cohort studies, and case–control studies. Studies were excluded in the case that groups were composed of fewer than 10 subjects, or when the study dropout rate was >20%. For MNT questions, only studies that evaluated the effects of nutrition therapy provided by an RDN or international equivalent were included in the review. The Academy EAL uses the term *international equivalent* to allow for MNT studies conducted outside the United States. To qualify as an international equivalent, reported credentials must be recognized by the International Confederation of Dietetic Associations.[12]

Additional searches were completed by mining the reference lists of identified meta-analyses and review articles for primary studies and relevant articles included in the 2008 GDM EAL project. The work group considered each study identified and determined inclusion or exclusion by consensus. A total of 29 studies (Figure 2[13]) were included in the SRs, five of which were used to answer more than one question.[14-18] Trained evidence analysts extracted data and critically appraised each article. Draft evidence summaries and overview tables were prepared by the lead analyst. The work group reviewed, summarized, and graded the quality of the evidence, summarizing the results in 12 conclusion statements. Not all evidence analysis questions were used to develop recommendations. MNT for prevention of GDM was outside the scope of the guideline. In addition, no evidence was found to answer several of the research questions. Six of the 12 completed SRs were used in the 2016 GDM guideline. A complete list of the evidence analysis questions, conclusions and grades, and the identification of conclusion statements used to support the guideline recommendations can be found in Figure 3.

Before development of the 2016 guideline, the work group selected the following topics from the 2008 GDM EBNPG for update: caloric intake, macronutrient and micronutrient intake, physical activity, use of nonnutritive sweeteners, alcohol consumption, and nutrition M&E. The 2008 recommendations for GDM risk assessment and screening, blood glucose (BG) monitoring, breastfeeding promotion, pharmacologic therapy, and prevention of type 2 diabetes were not included because the topics were outside the scope of the 2016 GDM guideline. New recommendations were added for referral to an RDN and meal and snack distribution. The 2008 recommendation for assessment of BMI and weight gain was moved to the 2016 nutrition assessment recommendation. The 2008 macronutrient and micronutrient recommendation was split into two separate recommendations in the 2016 guideline. Figure 4 provides an overview of the 2008 and 2016 recommendation revisions and updates.

No relevant studies were identified for some questions. According to the Academy's guideline development methodology,[11] external evidence-based guidelines (non-Academy) may be incorporated into EAL EBNPGs with a rating equivalent to the Academy's recommendation rating scheme. The work group identified the Endocrine Society's Diabetes and Pregnancy clinical practice guideline[19] and the ADA Standards of Medical Care in Diabetes 2016[20] for this purpose. Both external guidelines were subsequently approved by the Academy Evidence-Based Practice Committee during September 2016. In addition, other credible resources, such as consensus reports, position papers, standards of practice, and other guidelines, were used to strengthen and broaden the scope of the EAL EBNPG.

Following completion of the SR and the review of the 2008 GDM Guideline, the work group developed 18 evidence-based nutrition practice recommendations within 11 topic areas (Figure 5). Recommendations were rated Strong, Fair, Weak, Consensus, or Insufficient Evidence, according to the Academy Rating Scheme of Recommendations, and each recommendation was classified as either imperative (broadly applies to the target population) or conditional (applies in certain circumstances).[11]

The GDM EBNPG went through internal and external review, with the latter conducted by an interdisciplinary group of 14 recognized experts in GDM. Following the review, the work group responded to each comment provided and made revisions as indicated, by consensus.

Guideline Recommendations

This EBNPG was developed for RDNs caring for adult women with GDM and provides a starting point for individualizing nutrition care. It may also be a valuable resource to other health professionals involved in the care and treatment of women with GDM. In addition, the guidelines may serve as a resource for institutional development of effective clinical practice policy in nutrition management of GDM or for consumer education. The guidelines are limited to nutrition and lifestyle recommendations and do not address specific information on GDM screening, glycemic goals, medication management, or special populations. Practitioners interested in these topics are encouraged to review GDM resources from other professional organizations, including the ADA, the American College of Obstetricians and Gynecologists, and The Endocrine Society. Application of this guideline is not intended for pregnant women with pre-existing diabetes (type 1 or 2), undiagnosed type 2 diabetes, or women who are at risk for developing GDM (without diagnosis of GDM).

A total of 18 recommendations (Figure 5) make up the 2016 EAL Gestational Diabetes EBNPG. Four recommendations (MNT, calorie prescription, CHO prescription, and CHO and postprandial breakfast glycemia) were based on EAL SRs and two recommendations (referral to an RDN and physical activity) were based on external guidelines.[19,20] All six were rated according to the Academy's recommendation rating scheme.[11] The remaining 11