What to Do When Doctors Disagree on Diets for Women With Gestational Diabetes

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Medical nutrition therapy is considered the cornerstone of treatment for gestational diabetes mellitus, even though there is no consensus on the best dietary approach to achieve optimal glycemic control and positive maternal and fetal outcomes. In this article, we present a case from our clinic of a woman with gestational mellitus, the evidence for the level of macronutrients to include in the diet, and the use of glycemic index for dietary planning. We also review the evidence for emerging dietary therapies and provide general recommendations that should be individualized to the patient. Nutr Today. 2018;53(3):132–141

Gestational diabetes mellitus (GDM) is diabetes diagnosed in the second or third trimester of pregnancy that is clearly not type 1 or type 2.[1] It has been associated with complications during and after pregnancy. In addition, it is a risk factor for developing GDM in subsequent pregnancies or type 2 diabetes mellitus (T2DM) in the future. The key strategies for prevention and reduced risk of complications from GDM include (1) achieving and maintaining optimal glycemic control during pregnancy, (2) consuming a carbohydrate (CHO) controlled meal plan with adequate nutrient content to support maternal needs and fetal growth that has been individualized by a registered dietitian nutritionist (RDN), (3) gaining weight according to the Institute of Medicine guidelines, (4) increasing physical activity, and (5) using medications if unable to achieve glycemic control with lifestyle management alone.[1–8] The conventional dietary approach of restricting CHOs to 30% to 40% of calories has been challenged, but because of limited evidence, there is no consensus on which dietary approach, especially related to the type and amount of CHO, leads to the optimal outcomes.[9–11] There is agreement that it is critical for the woman to keep her blood glucose level under control to minimize the complications to mother and infant. The primary outcomes studied related to different types of dietary advice for mother and infant are listed in Table 1.[11]

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The conventional dietary approach of restricting CHOs to 30% to 40% of calories has been challenged.

A 2017 Cochrane[11] review identified 10 different types of advice including but not limited to the levels of CHO and use of the glycemic index (GI) to manage blood glucose levels. In 2017 the American College of Obstetrics and Gynecology[2] updated its Practice Bulletin to present management guidelines that have been validated by appropriately conducted clinical research. In this article, we focus on the evidence for the level of CHO to include in the diet as well as the use of GI for planning a diet for a woman with GDM. We present a case from our clinic of a woman with GDM, and the type of advice she received from her clinician, as well as her diet and exercise plan, could have been individualized in collaboration with an RDN, and we make suggestions for individualizing nutritional care.

CASE PRESENTATION

Ms J.C. is a 31-year-old woman with morbid obesity who has had 6 previous pregnancies and 2 live births. Her first birth was complicated by a vacuum-assisted vaginal delivery, shoulder dystocia, and fourth-degree perineal laceration. Her second birth was an uncomplicated spontaneous vaginal delivery. She did not have GDM in either of these full-term pregnancies. Prepregnancy, J.C. was measured at 60 inches tall and 241 lb (body mass index, 48 kg/m^2). The clinic uses a 2-step screening process that starts with a 50-g oral glucose tolerance test (OGTT) and, if positive, follow-up with a 3-hour OGTT. During this, her ninth pregnancy, she was diagnosed with GDM at 26 weeks after failing both

TABLE 1 Different Types of Dietary Advice for Women With Gestational Diabetes Mellitus: Primary Outcomes[11]

Fetal/Neonatal/Childhood Primary Outcomes	Maternal Primary Outcomes
→ Large-for-gestational age (birth weight ≥90th percentile for gestational age)	→ Hypertensive disorders of pregnancy (including preeclampsia, pregnancy-induced hypertension, eclampsia)
→ Perinatal mortality (stillbirth and neonatal mortality)	→ Cesarean delivery
→ Neonatal mortality or morbidity composite	→ Type 2 diabetes mellitus
→ Neurosensory disability	

screening tests. Table 2 has her laboratory values from the 1-hour glucose tolerance test or Glucola, the most common method of screening for GDM. Table 3 has the values from her follow-up 3-hour OGTT, which was abnormal. Her physician counseled her on the meaning of the results and the risks to herself and her baby if she did not manage her blood sugar. She was given brief counseling on a diet and physical activity for diabetes management as outlined in the prenatal education book given to all our pregnant patients (Figure 1). She was instructed in-home glucose monitoring with pregnancy goals of fasting less than 90 mg/dL and 2-hour postprandial less than 120 mg/dL and weight maintenance. At the time of her diagnosis, she had gained 23 lb, which exceeded the goal of 11 to 20 lb explained to her at an earlier visit.[7]

In follow-up, 2 weeks later, Ms J.C. presented with a blood glucose but not a diet log. She reported checking her blood glucose levels 6 times a day. All fasting blood glucose levels were above the recommendation at 106 to 198 mg/dL, and postprandial levels were mostly higher than recommended at 101 to 190 mg/dL. She said she liked fruits and vegetables but had a hard time getting them. She stated she was taking a prescription prenatal vitamin mineral supplement. Because her blood glucose was elevated, she was advised to take metformin XR at a dosage of 500 mg twice a day and reminded to eat 3 balanced meals a day plus snacks between meals and avoid foods with lots of sugar in them and be physically active.

In follow-up 1 week later, she presented with no logs but verbally reported that her fasting blood sugars were in the range of 100 to 120 mg/dL and her postprandial blood sugars were in the 120s (mg/dL). She stated she took the metformin only once because she did not like the way it made her feel. She was referred for medical nutrition therapy (MNT) but did not keep her appointment.

Ms J.C.'s medical history includes morbid obesity, depression with anxiety, and tobacco use. Her pertinent social history includes full-time employment at a social service agency and being a single mother. She missed many of her prenatal appointments because of her work and parenting schedules, and she was seen multiple times in labor and delivery triage for musculoskeletal concerns. She was transferred to a regional high-risk obstetrical clinic for antepartum fetal surveillance at 32 weeks and admitted at 36 weeks for inpatient monitoring because of nonreassuring fetal testing. Her labor was induced at 37 weeks because of poorly controlled GDM despite medical management and associated maternal and fetal risks. She has not yet followed up for postpartum care or a 2-hour glucose tolerance test recommended to diagnose persistent type 2 diabetes at 6 weeks postpartum.

Her labor was induced at 37 weeks because of poorly controlled GDM despite medical management.

EVIDENCE TO GUIDE DIETARY PLANNING

The conventional diet approach for managing GDM has been CHO restriction (30%–40% energy from total calories),

TABLE 2 Results of Ms J.C.'s 1-Hour Screening Laboratory Test

Component Results	Value	Date Collected
Glucose (Glucola challenge)	143 mg/dL	
Screening for glucose intolerance during pregnancy: 1. 50-g Oral glucose load administered during the 24th–28th week of gestation 2. Venous plasma glucose measured 1 h after the oral glucose load. A result ≥140 mg/dL identifies approximately 80% of women with gestational diabetes. Venous plasma glucose ≥130 mg/dL identifies 90% of women with gestational diabetes.		
If the result is greater than either of the 2 criteria above, an oral glucose tolerance test is indicated.		

TABLE 3 Results of Ms J.C.'s 3-Hour Oral Glucose Tolerance Test

Component Results	Value, mg/dL	Date Collected
Glucose (fasting)	99	
Glucose (1 h)	196	
Glucose (2 h)	167	
Glucose (3 h)	81	
Gestational tolerance test interpretation: Post 100-g glucose load[a] Fasting 105 mg/dL 1 h, 190 mg/dL 2 h, 165 mg/dL 3 h, 145 mg/dL		

[a]Values greater than or equal to 2 or more of the above following an overnight fast of 8 to 14 hours and unrestricted diet and physical activity for the previous 3 days meet criteria for diagnosis of gestational diabetes mellitus.

which usually resulted in a higher fat content. There is emerging evidence that a diet higher in nutrient dense CHOs may result in better outcomes. There is the suggestion, as well, that using the GI of foods to plan diets may result in better glucose management. Physicians, nurse midwives, and RDNs are all challenged to advise women on the optimal approach for managing their blood glucose levels.[9,10]

What the Experts, Textbooks, and Manuals Now Recommend

Expert Recommendations

Lifestyle management including diet, appropriate weight gain, and physical activity are considered essential components of controlling GDM.[1–8] The 2018 American Diabetes Association Standards of Care[1] states MNT for GDM is an individualized nutrition plan developed between the patient and the RDN familiar with the management of GDM and does not specify the optimal amount and type of CHOs. They recommend relying on guidance from the Dietary Reference Intakes, which is a minimum of 175 g of CHO, a minimum of 71 g protein, and 28 g of dietary fiber. The American College of Obstetricians and Gynecologists Practice Bulletin[2] continues to specify the percentage of CHO be limited to 33% to 40% of calories, with the remaining calories divided between protein (20%) and fat (40%). In its 2014 practice paper, the Academy of Nutrition and Dietetics[3] stated that for women with GDM improved outcomes are observed with dietary intake limiting CHOs to 45% of energy, but further research is needed regarding goals for protein, fat, fiber, and energy.

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Textbook Descriptions of Lifestyle Management for GDM

Hacker & Moore's Essentials of Obstetrics and Gynecology[6] describes a diet that has 45% to 50% of its calories from CHO (with lots of fiber), 20% to 25% from protein, and 20% to 25% from fat. The caloric requirement is calculated on the basis of ideal body weight and distributed throughout the day (20% at breakfast and bedtime snack each and 30% at lunch and dinner each). In an online clinical reference tool used by physicians,[5] CHO is described as the primary nutrient affecting postprandial glucose levels and should be limited to 40% calories while ensuring that ketonuria does not ensue. In a highly regarded nutrition

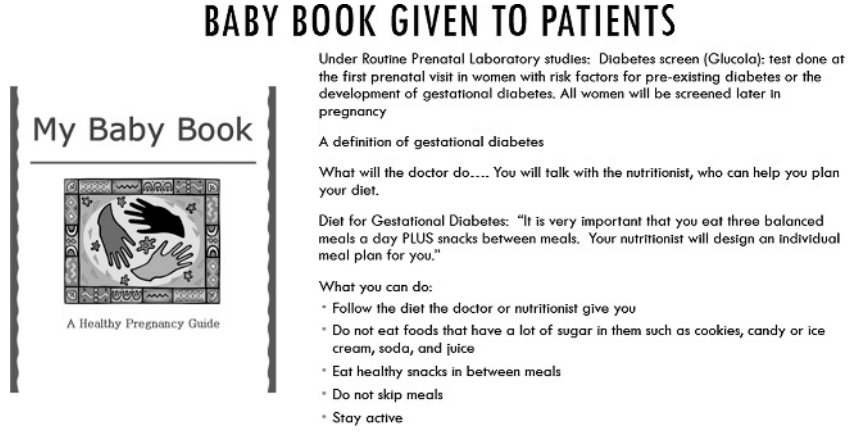

FIGURE 1. Typical advice to patients about gestational diabetes mellitus.

textbook[8] MNT, a CHO-controlled meal plan with optimal nutrition, adequate energy for appropriate weight gain, and achievement and maintenance of normoglycemia without ketosis are regarded as the cornerstone of treatment for GDM. This text notes the traditional approach has limited CHO to 30% to 40% of energy, but viable alternatives including use of foods with low GI exist. The online *Nutrition Care Manual* used by RDNs[4] recommends a diet with a minimum of 175 g of CHO per day to provide glucose for the fetal brain and prevent ketosis.

Observations by Clinicians in Practice

Some physicians observe that women who consume ready-to-eat processed cereal, fruit juices, instant products, and other highly refined products have higher postprandial blood glucose levels compared with those who eat less refined products and whole fruit. They recommend their patients consume unrefined, whole-grain breads, old-fashioned oatmeal, nuts, legumes, and lentils because these foods appear to have a lower glycemic response.[9,11]

What the Research Studies Demonstrate

Ten Dietary Treatments Presented in a 2017 Cochrane Review

Table 4 lists 19 trials of different types of dietary advice given to women with GDM; the number, size, and location of the studies; and outcomes from the intervention.[12] Recognizing that the current evidence is very limited, the authors concluded that there were no clear differences in outcomes, except for a possible reduction in cesarean delivery for women receiving a DASH (Dietary Approaches to Stop Hypertension) diet as compared with a control diet.

Table 4 lists 19 trials of different types of dietary advice given to women with GDM; the number, size, and location of the studies; and outcomes from the intervention. Researchers have studied the impact of a variety of nutrients and dietary strategies on prevention and management of GDM not included in the Cochrane review[12] including vitamin D alone and in combination with calcium supplementation; fish oil, primrose oil or linoleic acid, and γ-linolenic acid; magnesium and zinc supplementation; and dietary bioactive compounds such as flavonoids and polyunsaturated fatty acids.

Additional Dietary Studies

There are several studies published since the Cochrane review that merit a brief discussion. There is continued interest in the use of GI to plan meals. Four of the studies included in the Cochrane review,[12] especially those from Australia, noted possible benefit from using a diet with low or moderate GI. It should be noted that consumers in Australia have less access to information about the nutrient content, including CHOs, of their food because they do not have Nutrition Facts labeling like the United States. Women participating in a small Australian study were provided all their meals and experienced reduced diurnal glycemic oscillations. The glycemic load was calculated by a dietitian, and the women experienced 50% lower glucose levels, increased time within target range, and less glycemic variability than the conventional diet.[13] This suggests that improvement in glycemic control may be obtained by changing the type of CHO rather than by decreasing CHO. In a retrospective cohort study of 436 women, there appeared to be a dose-response relationship and less macrosomia for the infants of women receiving MNT.[14] Unfortunately, no details of the type of diet were included in the report. In 2 additional small studies where the food was provided to the women, the diet was liberalized to as high as 50% to 60% of the calories from more complex CHOs and less fat. The question studied was: "Would a high-complex-CHO, lower-fat diet improve maternal insulin resistance and infant adiposity?" This trial, referred to as CHOICE, did result in women achieving glycemic control.[11,15]

Other Strategies Studied

Researchers have studied the impact of a variety of nutrients and dietary strategies on prevention and management of GDM not included in the Cochrane review[12] including vitamin D alone and in combination with calcium supplementation; fish oil, primrose oil or linoleic acid, and γ-linolenic acid; magnesium and zinc supplementation; and dietary bioactive compounds such as flavonoids and polyunsaturated fatty acids. Perhaps the most interesting

TABLE 4 Cochrane Review 2017: Different Types of Dietary Advice for Women With Gestational Diabetes Mellitus and Outcomes

Diet	Studies	n	Intervention Outcomes (No Clear Differences in Primary Outcomes[a] Except DASH Reported Separately)	Setting
Low-moderate glycemic index (GI) vs moderate to high GI	4	224	Possible benefit for glycemic control (lower end of intervention 2-h postprandial glucose) for women in low/moderate GI group (1 trial, 83 women)	Australia, Canada, China, and Mexico
Energy restricted vs no energy restriction	3	437	More neonatal hypocalcemia in the energy-restricted group (1 trial, 299 infants); possible benefits for glycemic control (lower end of intervention fasting glucose, 24-h mean plasma glucose, and 1-h postprandial glucose) for energy-restricted group (2 trials, 311 women)	Australia, Canada, US
Dietary Approaches to Stop Hypertension (DASH) diet vs diet with matching macronutrients	3	136	Fewer macrosomic babies in DASH group, lower ponderal indices, lower birth weights (2 trials, 86 infants); lower use of additional pharmacotherapy (2 trials, 86 women), possible benefits for insulin sensitivity with lower end of intervention homeostatic model assessment of insulin resistance and blood insulin levels (1 trial, 32 women); glycemic control (end of intervention fasting glucose) (2 trials, 66 women)	Iran
Low carbohydrate vs high carbohydrate diet	2	182	Less gestational weight gain in lower-carbohydrate group (1 trial, 66 women)	Spain, Poland
High unsaturated fat vs low unsaturated fat	2	111	High unsaturated fat diet higher body mass index at 5–9 mo postpartum (1 trial, 27 women) with less favorable insulin sensitivity with higher 38-wk insulin levels (1 trial, 24 women); less favorable glycemic control at 38 wk (fasting, postprandial, and hemoglobin A_{1c}) (1 trial, 25 women)	China, Denmark
Low GI vs high fiber moderate GI	1	99	No clear differences (1 trial)	Australia
Diet + behavior advice vs diet only	1	200	Women receiving additional diet and related behavior advice experienced possible glycemic benefit (lower end of intervention fasting plasma glucose) (1 trial)	Italy
Soy protein enriched vs no soy protein diet	1	69	Fewer babies in soy-enriched diet group developed hyperbilirubinemia (1 trial, 68 infants); possible benefits in glycemic control in soy-enriched diet group, plasma glucose (1 trial, 69 women)	Iran
High fiber vs standard fiber	1	22	No clear differences (1 trial)	US
Ethnic specific vs standard healthy diet	1	20	No clear differences (1 trial)	Italy

[a]Secondary outcomes.

TABLE 5 Recommendations to Physicians for the Dietary and Physical Activity Management of Gestational Diabetes Mellitus (GDM)
Refer women with GDM to an RDN for individualized MNT
Provide consistent advice to patients from all team members
Strongly recommend avoidance of beverages containing sugar and sweets/desserts
Encourage consumption of a diet rich in nonstarchy vegetables, whole or canned/frozen unsweetened fruits, and whole grains, low-fat dairy or diet similar to DASH (Dietary Approaches to Stop Hypertension)
Provide guidance on serving size of foods high in carbohydrates
Encourage 3 meals and 2–3 snacks with carbohydrates spread in smaller amounts throughout the day
Recommend no less than 175 g carbohydrates per day (RDA for pregnancy)
Breakfast: 15–30 g carbohydrate
Lunch and dinner: 45–60 g carbohydrate
Snacks: 15–30 g carbohydrate
Encourage low fat cooking methods and lean meats
Unless a woman asks and has the interest and resources to pursue, do not recommend using the glycemic index approach to meal planning
Unless the woman asks and has the resources to purchase, do not recommend probiotics and dietary supplements. If recommending, provide specific product information.
Provide counseling on exercise that would optimally be 30 min of moderate-intensity aerobic exercise at least 5 d/wk or a minimum of 150 min/wk. Tailor to the patient's ability.

alternative therapy is the use of probiotics. Researchers are investigating the role of gut microbiome as a modulator of metabolic and inflammatory processes. A wide variety of bacteria have been studied in a limited way with findings ranging from no effect to potential positive effects on macrosomia, appropriate weight gain, reduced fasting blood glucose, decreased insulin resistance, and decreased serum insulin. A 2014 Cochrane Review identified a single high-quality trial showing a reduction in rate of GDM among women randomized to probiotics early in pregnancy.[16] Currently, the optimal dose, ideal bacterial composition, and safety are unknown.[16]

One study focused not on the composition of the diet itself but on the stress and anxiety women with GDM experience. More than half of the 30 women participating struggled with dietary management between 33 and 37 weeks' gestation, with significantly higher stress scores noted among participants requiring insulin therapy. The authors suggested that tailored care plans and strong communication between the patient and the entire health team may help decrease dietary management stress.[17]

Finding the Balance

Medical nutrition therapy is considered the cornerstone of treatment for GDM. Women who receive only general dietary advice such as that listed in Figure 1 are less likely to achieve glycemic control compared with women who receive tailored MNT from an RDN. Table 5 summarizes the approach we recommend to the teams in our clinic who provide care for women with GDM. Because the stress associated with the diagnosis of GDM can be reduced if all providers help the women improve their diabetes self-management behaviors including a diet, physical activity, and self-monitoring plan tailored to the patient's life circumstances.[18] In addition, strong communication between the healthcare team and the woman is critical. Based on our review of the evidence, we compiled the messages we would like our team to give consistently (Table 4). We encourage the RDNs who provide care to women with GDM to proactively reach out to the physicians and other team members to provide this advice until further research warrants a change in approach.

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Changing the Form of CHO

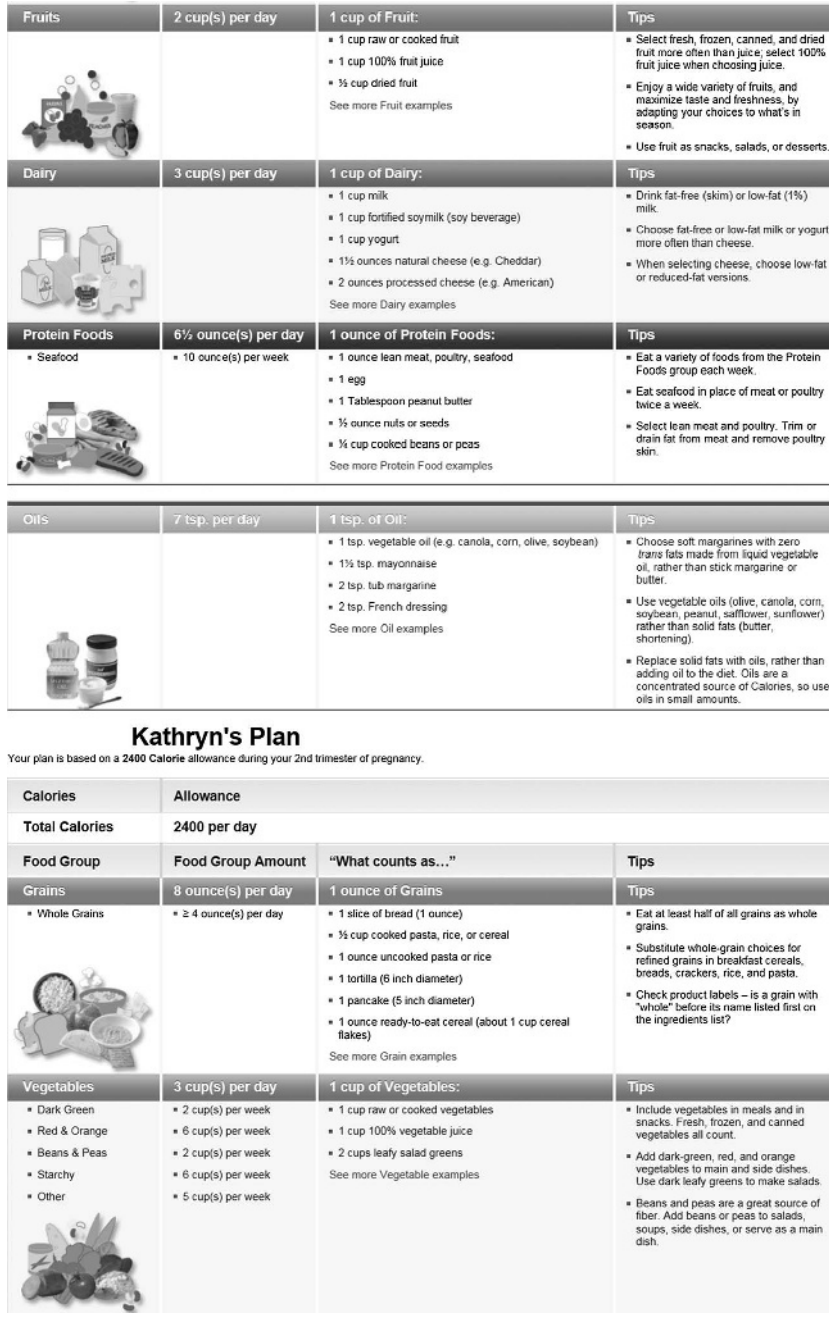
While research suggests that improvement in glycemic control might be obtained by changing the form of CHO rather than decreasing the amount consumed,[13] many of the foods and beverages consumed by patients in the studies testing a low GI diet are neither physically nor culturally available to the women in our clinic. Therefore, we do not routinely use the GI or glycemic load for meal planning. For the rare woman who asks, we can provide the international table of GI and glycemic load values[19] (www.glycemicindex.com) but caution the woman that a single food can have a range in GI values, making it difficult to determine the impact on glycemic control

without closely monitoring their blood glucose levels. To individualize the diet using this approach would require the RDN and the woman with GDM to evaluate the glycemic response to foods, at different times of the day and in different combinations of food.[14]

There may be women who are able to eat a sufficiently high complex CHO and low-fat diet to achieve glycemic control.[9] Some clinicians report that their patients respond positively to the message to eat more "brown than white" cereals, breads, and grains rather than a message to eat complex CHO or whole grains.

Case Revisited

The guidelines for physicians managing women with GDM all recommend that they refer the patient to an RDN for individualized MNT. But with the conventional approach being challenged, how should the RDN proceed? Ms J.C.'s management of her GDM was not optimal. The



Fruits	2 cup(s) per day	1 cup of Fruit:	Tips
		▪ 1 cup raw or cooked fruit ▪ 1 cup 100% fruit juice ▪ ½ cup dried fruit See more Fruit examples	▪ Select fresh, frozen, canned, and dried fruit more often than juice; select 100% fruit juice when choosing juice. ▪ Enjoy a wide variety of fruits, and maximize taste and freshness, by adapting your choices to what's in season. ▪ Use fruit as snacks, salads, or desserts.
Dairy	**3 cup(s) per day**	**1 cup of Dairy:**	**Tips**
		▪ 1 cup milk ▪ 1 cup fortified soymilk (soy beverage) ▪ 1 cup yogurt ▪ 1½ ounces natural cheese (e.g. Cheddar) ▪ 2 ounces processed cheese (e.g. American) See more Dairy examples	▪ Drink fat-free (skim) or low-fat (1%) milk. ▪ Choose fat-free or low-fat milk or yogurt more often than cheese. ▪ When selecting cheese, choose low-fat or reduced-fat versions.
Protein Foods	**6½ ounce(s) per day**	**1 ounce of Protein Foods:**	**Tips**
▪ Seafood	▪ 10 ounce(s) per week	▪ 1 ounce lean meat, poultry, seafood ▪ 1 egg ▪ 1 Tablespoon peanut butter ▪ ½ ounce nuts or seeds ▪ ¼ cup cooked beans or peas See more Protein Food examples	▪ Eat a variety of foods from the Protein Foods group each week. ▪ Eat seafood in place of meat or poultry twice a week. ▪ Select lean meat and poultry. Trim or drain fat from meat and remove poultry skin.
Oils	**7 tsp. per day**	**1 tsp. of Oil:**	**Tips**
		▪ 1 tsp. vegetable oil (e.g. canola, corn, olive, soybean) ▪ 1½ tsp. mayonnaise ▪ 2 tsp. tub margarine ▪ 2 tsp. French dressing See more Oil examples	▪ Choose soft margarines with zero *trans* fats made from liquid vegetable oil, rather than stick margarine or butter. ▪ Use vegetable oils (olive, canola, corn, soybean, peanut, safflower, sunflower) rather than solid fats (butter, shortening). ▪ Replace solid fats with oils, rather than adding oil to the diet. Oils are a concentrated source of Calories, so use oils in small amounts.

Kathryn's Plan

Your plan is based on a **2400 Calorie** allowance during your 2nd trimester of pregnancy.

Calories	Allowance		
Total Calories	**2400 per day**		
Food Group	**Food Group Amount**	**"What counts as…"**	**Tips**
Grains	**8 ounce(s) per day**	**1 ounce of Grains**	**Tips**
▪ Whole Grains	▪ ≥ 4 ounce(s) per day	▪ 1 slice of bread (1 ounce) ▪ ½ cup cooked pasta, rice, or cereal ▪ 1 ounce uncooked pasta or rice ▪ 1 tortilla (6 inch diameter) ▪ 1 pancake (5 inch diameter) ▪ 1 ounce ready-to-eat cereal (about 1 cup cereal flakes) See more Grain examples	▪ Eat at least half of all grains as whole grains. ▪ Substitute whole-grain choices for refined grains in breakfast cereals, breads, crackers, rice, and pasta. ▪ Check product labels – is a grain with "whole" before its name listed first on the ingredients list?
Vegetables	**3 cup(s) per day**	**1 cup of Vegetables:**	**Tips**
▪ Dark Green ▪ Red & Orange ▪ Beans & Peas ▪ Starchy ▪ Other	▪ 2 cup(s) per week ▪ 6 cup(s) per week ▪ 2 cup(s) per week ▪ 6 cup(s) per week ▪ 5 cup(s) per week	▪ 1 cup raw or cooked vegetables ▪ 1 cup 100% vegetable juice ▪ 2 cups leafy salad greens See more Vegetable examples	▪ Include vegetables in meals and in snacks. Fresh, frozen, and canned vegetables all count. ▪ Add dark-green, red, and orange vegetables to main and side dishes. Use dark leafy greens to make salads. ▪ Beans and peas are a great source of fiber. Add beans or peas to salads, soups, side dishes, or serve as a main dish.

FIGURE 2. Example of MyPlan from www.supertracker.usda.gov for a pregnant woman.

following describes how we may have approached her case for diet and physical activity counseling.

Initial Visit With RDN

This visit ideally would have occurred before Ms J.C. was diagnosed with GDM. She is at high risk of GDM because of her pregnancy outcome history and obesity, making it important for the RDN to begin counseling her early in her pregnancy. Where possible to reduce the risk of a woman not keeping a referral appointment for MNT, providing these services during the scheduled prenatal visit would be optimal. If the Ms J.C. had kept her appointment(s) with the RDN, the following assessment and counseling would have occurred.

In the initial visit, the RDN would conduct a full nutritional assessment utilizing the Nutrition Care Process (www.andeal.org/ncp). The RDN would assess the patient's learning needs, willingness, and ability to make changes as well as cultural and food preferences that may affect adherence to a meal plan. The initial assessment would include J.C.'s usual intake of food and beverages, including amounts and variety consumed. During this assessment J.C. would be screened for food insecurity and linked to local resources as needed.[20] It should be noted that Ms J.C. was not food insecure at the time of this pregnancy; however, she indicated there have been times when the food she bought just did not last and she did not have the money to get more, suggesting that referral for assistance from local resources is important.[20]

At this visit, the RDN would calculate Ms J.C.'s caloric needs using an acceptable formula for an ambulatory patient. Using the Academy of Nutrition and Dietetics' *Nutrition Care Manual*,[4] interactive calculator, and the Mifflin St Jeor formula for patients with obesity, an estimate of 1733 calories was made. Ms J.C. is sedentary and in her first trimester of pregnancy, so no additional calories were added. An additional 340 calories for the second and an additional 452 calories for the third trimester would be added per day to meet pregnancy needs. The calorie level of the meal plan should be individualized based on the (1) assessment, (2) prepregnancy body mass index, (3) physical activity level, and (4) pregnancy weight gain to date. The RDN would be sensitive to how much information Ms J.C. could use at this visit. The RDN would calculate and document the calorie goal in her chart but might focus the discussion on portion sizes of CHO foods. The RDN would reinforce the physician's counseling on appropriate weight gain.

Ms J.C. would be counseled that more than one visit is needed to learn about the best diet and physical activity plan for her. On this visit she would be counseled on the importance of avoidance of sugar-sweetened beverages, as well as sugary foods, fruit juices, and desserts, and the impact of these foods on weight gain. She would be encouraged to consume appropriate amounts of fruits, vegetables, whole grains, and low-fat dairy and to choose lean meals and lower-fat cooking methods. She would also be instructed in food safety practices.

The RDN would assess her health literacy and at this visit select a diet plan that would not overwhelm the patient. In this case, the RDN might use the Idaho Plate method found at http://www.platemethod.com. For other women, the RDN might tailor the plan generated for the pregnant patient at www.supertracker.usda.gov to the woman's preferences and budget. Figure 2 is an example of MyPlan for a pregnant woman from the Supertracker site. If time allowed, a review of how to use the Nutrition Facts label for portion size and calorie content would be done. The RDN would reinforce the physical activity plan the physician recommended, which was to spend 30 minutes a day walking to the park or playing with her children. At later visits, the RDN would work with Ms J.C. toward meeting the current recommendation for physical activity of 30-minute moderate-intensity aerobic exercise at least 5 days a week or a minimum of 150 minutes per week.[1,2] At the end of the visit, Ms J.C. would be assisted in setting a SMART Goal, a goal that is Specific, Measurable, Attainable, Realistic, and Timely/Trackable.[21]

Follow-up Visits With RDN After Diagnosis of GDM

When Ms J.C. was diagnosed with GDM, she would have additional visits with the RDN. The Gestational Diabetes Evidence-Based Nutrition Practice Guideline[22] suggests a minimum of 3 encounters with an RDN for self-management education. It notes a phone encounter supplemented with food and blood glucose records obtained via fax or e-mail may be an option. In addition, it recommends a follow-up visit after delivery focusing on lifestyle modifications aimed at reducing weight and increasing physical activity, as GDM is a risk factor for subsequent T2DM.

The RDN would again review the importance of avoidance of sugar-sweetened beverages and sugary foods and desserts and their impact on blood glucose levels. Ms J.C. would be taught to monitor blood glucose levels at home, record results, and recognize if she was not achieving her goals and when to call her physician. She would be counseled on eating smaller portions of CHO at meals and spreading intake through the day (in 3 meals and 2–3 snacks) rather than limiting or eliminating CHO from the diet.

On follow-up in 2 weeks, the RDN would assess J.C.'s CHO intake and blood glucose levels and based on those assessments may instruct her on goals for CHOs at each meal. An initial goal would be at least 175 g CHO per day, spread through smaller meals and portions. For the patient who desires more detailed guidance, the RDN might suggest a goal of 15 to 30 g of CHO at breakfast if the 2-hour prandial blood glucose level is elevated. Reasonable meal

and snack goals would be 45 to 60 g of CHO at meals and 15 to 30 g of CHO at snacks. Again, these would be individualized based on the patient's blood glucose log, personal preferences, CHO intake, and nutritional adequacy of the diet. If goals cannot be met with diet changes, the RDN would contact the physician and inform him/her of the current findings and potentially try using a different approach to CHO control.

The RDN might suggest a goal of 15 to 30 g of CHO at breakfast if the 2-hour prandial blood glucose level is elevated. Reasonable meal and snack goals would be 45 to 60 g of CHO at meals and 15 to 30 g of CHO at snacks. Again, these would be individualized based on the patient's blood glucose log.

Ms J.C. would have additional visits supplemented with phone encounters with the RDN to support her in self-management and make adjustments as needed. She would be counseled about her risk of T2DM postpartum and scheduled to return for MNT several weeks after delivery.

SUMMARY

While lifestyle is considered the cornerstone of prevention and management of GDM, the optimal diet for glycemic control has received little study. Registered dietitian nutritionists are aware of the controversies surrounding the composition, quality, and quantity of CHO in the diet recommended to women with GDM. Registered dietitian nutritionists should take leadership for outlining evidence-based strategies to achieve glycemic control with diet and physical activity for the team managing women with GDM. The team should provide consistent messages to the woman. The RDN should individualize the diet approach to the patient's interest, ability to follow, and response to the diet to reduce the risks of poor outcomes for herself and her infant.

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Advanced Medical Nutrition Therapy, 1st Edition Jones and Bartlett Learning 2018

Kelly Kane MS, RD, and Kathy Prelack, PhD, RD Advanced Medical Nutrition Therapy provides students and clinicians with the tools needed to render effective and evidence-based nutrition care plans based on the fundamentals of diet and disease. This text utilizes a practice-oriented, case-based approach that incorporates problem-based learning and engages the reader in various clinical scenarios. This approach encourages the reader to digest the didactic scientific concepts while applying them to patient-based clinical situations. Advanced Medical Nutrition Therapy begins by presenting core concepts relating to nutrition and biochemical assessment, as well as enteral and parenteral nutrition. The text then delves into medical nutrition therapy for specific disease states, as well as therapy for specific life stages. Along the way, various pedagogical features emphasize the important of evidence-based practice and a thorough understanding of current research. While appropriate for an undergraduate medical nutrition therapy course, Advanced Medical Nutrition Therapy also boasts coverage of specialized topics such as oral health, as well as focused chapters on disorders of maldigestion and malabsorption. The text integrates aspects of both adult and pediatric nutrition, providing an opportunity to discuss the similarities and differences in various adult and pediatric states. Congratulations to both Kelly and Kathy on this wonderful accomplishment!

Diet, Nutrition, Physical Activity and Cancer: A Global Perspective

The American Institute for Cancer Research (AICR) is excited to announce the release of their newest report, "Diet, Nutrition, Physical Activity and Cancer: a Global Perspective."
A panel of independent experts from across the globe reviewed decades of evidence and from their conclusions developed the most recent cancer prevention advice available. The full report, which is more than 12 000 pages long, includes systematic literature reviews, will be available online. The print summary is available to provide you with an accessible overview of the evidence behind our work and will be an invaluable reference and teaching tool. Request your free copy of the print summary by going to www.aicr.org/report-request. A shipping and handling fee of $10.00 per report will be requested when you place your order.

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