

# Plant-Based Diets for Diabetes During Pregnancy

PhysiciansCommittee  
for Responsible Medicine



Diabetes during pregnancy includes pregnant women who have either type 1 diabetes, type 2 diabetes, gestational diabetes mellitus (GDM), or undiagnosed type 2 diabetes that has been identified during pregnancy. Diabetes is a condition in which the body does not tolerate carbohydrates, which results in high blood glucose (sugar) levels that can lead to serious complications including blindness, amputations, kidney disease, and cardiovascular disease. During pregnancy it is extremely important that glucose levels are controlled because even mild elevations can cause serious harm to mother and baby. Diabetes increases the risk of miscarriage, birth defects, preeclampsia (marked by high blood pressure, protein in urine, and swelling), abnormally large babies, and other problems.<sup>1,2</sup>

## Gestational Diabetes Mellitus (GDM)

The number of women with GDM has been increasing in tandem with the epidemics of obesity and type 2 diabetes. It is the most common medical condition during pregnancy, affecting nearly 9% of all pregnancies.<sup>3</sup> Increased maternal age, overweight or obesity, a past history of GDM, and certain ethnicities (Hispanic, Black, Native American, South or East Asian, or those of Pacific Island descent) are risk factors for GDM.<sup>3</sup> Children have an eight-times-greater risk of developing prediabetes or type 2 diabetes at a young age (19-27 years) compared with babies from normal pregnancies. Mothers have a 7.43-times-greater risk of developing type 2 diabetes compared with women who do not have GDM.<sup>2</sup> Risks of high blood pressure, lipid disorders, and cardiovascular disease are also significantly higher for mother and baby.

All women who are at risk for diabetes should be tested at their initial prenatal visit to screen for potential undiagnosed diabetes. Testing for GDM usually occurs during 24 to 28 weeks of gestation with an oral glucose tolerance test. There are two testing techniques: one-step strategy or two-step strategy.<sup>4</sup> Your doctor will determine which test is right for you. GDM normally goes away as soon as the baby is born. However, all women should be tested four to 12 weeks postpartum (after birth) to rule out preexisting diabetes. Women who have had GDM should have routine screenings every three years.

Natural hormonal changes during pregnancy cause insulin resistance. Pregnancy is also a state of inflammation involving

the immune system that is triggered so the body won't "reject" the growing fetus. Insulin resistance and inflammation are exacerbated in women who have obesity or overweight and/or have underlying insulin resistance. In normal pregnancy, the body must produce 200-250% more insulin. In GDM, the mother can't produce enough insulin to maintain normal glucose levels. High blood glucose levels cross the placenta triggering fetal insulin production. These high insulin levels drive growth of the fetus causing macrosomia (a large baby or large for gestational age [LGA] baby).<sup>5</sup>

## Diabetes During Pregnancy (Type 1 and Type 2 Diabetes)

It is important that all women with diabetes who are of childbearing age become aware of the importance of controlling glucose before and during pregnancy. Glucose levels should be as close to normal as possible for three months before conception to avoid complications. Diabetic retinopathy is a condition in which the blood vessels in the back of the eye (the retina) are damaged by high blood glucose levels. Pregnancy can cause a rapid progression of retinopathy in women with preexisting type 1 or type 2 diabetes. The American Diabetes Association (ADA) recommends a dilated eye exam prior to pregnancy and in the first trimester. Subsequent tests may be necessary if indicated by the results of these tests.<sup>1</sup>

**GDM** is the most **common medical condition** during pregnancy, affecting nearly **9%** of all pregnancies.<sup>3</sup>

Another complication is high blood pressure. Women with diabetes and high blood pressure or who have protein in the urine should reduce blood pressure to less than 135/85. Angiotensin-converting enzyme inhibitors and angiotensin II receptor blockers can cause birth defects and should not be used

during pregnancy.<sup>1</sup> If blood pressure targets cannot be achieved by increasing the intake of fruits, vegetables, whole grains, and legumes and reducing animal products, your health care provider can recommend an antihypertensive drug that is safe during pregnancy.

## Glucose Targets During Pregnancy

Glucose targets are very precise during pregnancy regardless of the type of diabetes. This is because high glucose levels can be very dangerous for both mother and baby. Frequent monitoring of blood glucose is recommended, including fasting and after meals. According to the ADA, mothers should meet one of the following targets:

- Fasting glucose < 95 mg/dL
- One hour after meals < 140 mg/dL
- Two hours after meals < 120 mg/dL<sup>1</sup>

These targets should be achieved without hypoglycemia (low blood glucose levels). For women with type 1 diabetes, this might be challenging to accomplish. Women should work with their providers to establish safe targets to avoid dangerously low glucose levels.

## Management of GDM

Management of GDM should include nutrition, exercise, frequent glucose monitoring as prescribed by a health care provider, and medication, if needed.

## Nutrition

The first line of therapy for GDM is nutrition and physical activity. Many women can achieve their blood glucose targets from healthful eating and exercise, without the help of insulin. The goals of nutrition are to promote normal glucose levels, provide adequate nutrients for the health of mother and baby, and ensure calories that promote optimal weight gain.

Reducing or limiting carbohydrates is often recommended to control glucose levels. However, evidence does not support this. One study found no significant difference in insulin needs or clinical outcomes when comparing a high-carbohydrate diet with a low-carbohydrate diet in women with GDM.<sup>6</sup> Another study found that restricting carbohydrates (fewer than 211 grams per day) increased the risk of LGA infants by 23%. The women who consumed more than 211 grams of carbohydrate per day had zero cases of LGA infants.<sup>7</sup> Reducing carbohydrates can impose unnecessary stress on the mother. Women will end up replacing carbohydrates with dietary fat. It has been well demonstrated that consuming fat, particularly saturated fat, increases fats in the blood, worsens insulin resistance, and causes greater fat accumulation of the fetus.<sup>8</sup> The Academy of Nutrition and Dietetics (AND) recommends carbohydrate-intake goals be individualized for women with GDM.<sup>3</sup>

Dietary interventions that are higher in carbohydrates and dietary fiber and lower in fat, cholesterol, sugar, and sodium have been found to have the best improvements in glucose tolerance, glucose

control, insulin resistance, the need for insulin, blood cholesterol, blood pressure, and markers of oxidative stress. Such diets also reduce the need for cesarean section deliveries and result in lower rates of LGA.<sup>3</sup> Diets that focus on carbohydrates with a low glycemic index (GI), such as whole grains, fruits, beans, and vegetables, have been found to significantly reduce the need for insulin and prevent excessive maternal weight gain.<sup>3</sup>

Plant-based diets that are high in nutrition quality and focus on low-GI carbohydrates can promote glucose control, prevent excessive weight gain during pregnancy, and enhance the health of mother and baby. These diets have been recognized by AND as nutritionally adequate for all stages of life, including pregnancy, and may be beneficial for women with GDM.<sup>9</sup>

Adherence to a **plant-based diet** before pregnancy **lowers the risk** for GDM.

Depending on results from glucose monitoring, the amount of carbohydrates should be kept consistent at each meal. Insulin resistance peaks in the morning. Having foods with a low GI for breakfast, such as oatmeal and fruit, may be beneficial. Women should emphasize the intake of foods high in fiber not only to control glucose but also to reduce the risk of preeclampsia.<sup>10</sup> Dietary fiber is found only in plant-based foods. According to AND, women with GDM should consume a minimum of 28 grams of fiber per day.<sup>3</sup> A plant-based diet that focuses on whole grains, legumes, fruits, and vegetables and avoids animal products should provide at least 40 grams of fiber a day.

Research shows that plant-based diets improve insulin sensitivity in subjects with diabetes and may do the same for women with GDM.<sup>11,12</sup> Reducing or eliminating animal products may reduce the risk of listeriosis. Listeriosis is a serious infection that is 20 times more common in pregnant women. *Listeria*, a species of bacteria, can cross the placenta and can cause premature delivery, miscarriage, stillbirth, and other problems. This infection can be avoided by staying away from luncheon meats, soft cheeses, pates and meat spreads, refrigerated smoked seafood, and raw or unpasteurized milk. Further, avoiding mercury-contaminated fish is also important. Methylmercury, a potent human neurotoxin, can easily cross the placenta and damage the fetal nervous system.<sup>13</sup>

## A Note About Prevention of GDM

Adherence to a plant-based diet before pregnancy lowers the risk for GDM. Researchers following 16,000 women from the Nurses' Health Study II found a significant inverse association between plant-based diets and GDM.<sup>14</sup> Plant-based diets are higher in fiber, which can protect against diabetes. In a separate



GETTY IMAGES

analysis of the Nurses' Health Study II, it was found that for every incremental intake of 10 grams of total dietary fiber, there was a corresponding 26% reduction in GDM. For every 5 grams of incremental increase in cereal or fruit fiber, there was a corresponding 23% and 26% reduction in GDM, respectively.<sup>15</sup> Women who report following a vegan and vegetarian diet have lower rates of cesarean delivery, less postpartum depression, and less maternal and fetal mortality. Women following vegan diets have lower rates of preeclampsia, which is associated with a low intake of fiber and high intake of fat and sugar.<sup>10</sup>

A high intake of red meat, processed meat, refined grains, french fries, and pizza was found to increase risk of GDM in the Nurses' Health Study II.<sup>16</sup> In women with no known risk factors for GDM, saturated fat intake from animal products significantly increased risk.<sup>17</sup> High consumption of meat and dairy products during the second trimester of pregnancy was associated with a 95% higher risk of developing GDM in Chinese pregnant women, compared with those consuming less meat or dairy.<sup>18</sup> The results of these studies are of particular concern, as many pregnant women increase their dietary protein during pregnancy due to the belief that high protein consumption is needed to help the fetus to grow. The dietary reference intake (DRI) for protein consumption is 71 grams per day during the second and third trimesters, which is about 25 grams more than prepregnancy needs.<sup>19</sup>

Other nutrition-related risks for GDM include low levels of vitamins C and D.<sup>2</sup> Plant-based diets are high in vitamin C, especially when including ample amounts of dark green leafy vegetables, Brussels sprouts, cauliflower, red and green peppers, sweet potatoes and winter squash, strawberries, citrus, kiwi fruit, and papaya. Women should have their vitamin D checked before pregnancy and supplement as needed if getting ample sunshine is not possible.

## Management of Type 1 and Type 2 Diabetes During Pregnancy

There is scant research on pregnant women with diabetes following a plant-based diet. However, it is well documented that a plant-based diet high in whole grains, legumes, fruits, and vegetables is beneficial for type 2 diabetes and is nutritionally adequate

during pregnancy.<sup>9,11,12</sup> Women with type 1 diabetes may also benefit from a plant-based diet. The nutrients, antioxidants, and phytochemicals can potentially reduce diabetes complications and protect the cells of the body from oxidative stress.<sup>20</sup> In all types of diabetes, it is important to monitor blood glucose levels frequently and adjust insulin as needed, which should be directed by a health care provider. Changes in insulin needs can occur, particularly during the second trimester. Insulin needs may also change in response to a plant-based diet. Insulin does not cross the placenta and is therefore the preferred agent for managing both type 1 and type 2 diabetes.<sup>1</sup> Women with GDM may also require insulin if glucose levels are not managed with diet and exercise. Insulin sensitivity increases dramatically after the baby is delivered, so insulin requirements will most likely decrease.

Weight gain and basic nutritional needs during pregnancy for GDM, type 1 diabetes, and type 2 diabetes are the same as for nondiabetic pregnancy. See [Plant-Based Diets for Pregnancy fact sheet](#) for details on nutritional needs.

## Postpartum

Women with GDM have a significantly higher risk of developing diabetes later in life. Plant-based eating patterns can significantly reduce that risk, while helping with weight management, blood pressure, and blood cholesterol control, as well as reducing the risk of certain types of cancer.<sup>21</sup> For women with preexisting type 1 or type 2 diabetes, insulin sensitivity will increase dramatically immediately after birth, reducing the amount of insulin needed. Women should be aware of the risk of low blood glucose levels.<sup>1</sup>

## Breastfeeding (Lactation)

In GDM, breastfeeding is beneficial to the mother by reducing the risk of being overweight later in life, as well as reducing the risk for type 2 diabetes and metabolic syndrome. Mothers with GDM who breastfed had lower levels of fasting glucose and insulin levels at six to nine weeks, decreasing diabetes risk post-GDM pregnancy.<sup>13</sup> Breastfeeding is beneficial to the baby by reducing risks of hypoglycemia after birth and type 1 diabetes later in life.<sup>13</sup> Nutritional needs for women with diabetes (all types) during breastfeeding are the same as for nondiabetic women (see our [Plant-Based Diets for Pregnancy fact sheet](#)).

## Tips for Plant-Based Nutrition for Pregnancy and Diabetes

1. Work with your health care provider, dietitian, or certified diabetes care and education specialist (CDCES) specializing in plant-based nutrition for diabetes. Glucose control is extremely important during pregnancy, and diet and exercise are imperative.
2. Choose foods from the Power Plate: whole grains, legumes, vegetables, and fruits.
3. Eat three meals and one to two snacks daily to help keep glucose levels steady.



Try to keep meals and carbohydrate portions about the same size at each meal. Avoid having one or two large meals. If glucose levels are high after breakfast, be sure to focus on the low-GI foods or reduce breakfast carbohydrates.

4. Watch for added fats and oils. Choose small portions of whole plant-based fats: nuts, seeds, and avocado. Avoid fried and greasy food.
5. Focus on foods with a low GI: oats, sweet potatoes, legumes, whole grains, fruits, whole-wheat pasta, and rye and pumpernickel bread. Bran cereal, muesli, and rolled or steel-cut oats are great choices. Barley, parboiled rice, couscous, corn, and quinoa have a low GI. Avoid cold cereals with added sugar, corn flakes, puffed rice cereals, and white bread.
6. Discuss supplementation with your health care provider, dietitian, and CDCES. Anyone following a plant-based diet should take a vitamin B12 supplement. An algae-based DHA supplement (100-300 mg) should be taken during pregnancy to ensure adequate essential fatty acid intake for baby's brain development. Choose plant-based foods high in alpha-linolenic acid: walnuts, chia seeds, hemp seeds, kale, and soybeans. Other nutrients of concern during pregnancy include folate, iron, vitamin D, zinc, and iodine. See [Plant-Based Diets for Pregnancy fact sheet](#).
7. Weight gain during pregnancy with diabetes depends on prepregnancy body weight. Calorie needs and target weight gain should be individualized. There are no extra calories needed during the first trimester. During the second and third trimester, 340 and 450 extra calories are needed, respectively. However, for women who have obesity or overweight, fewer calories are needed. Avoid calories from fatty foods, fast food, junk food, and sweets. Generally, weight gain should

be 25 to 35 pounds for normal body weight and 11 to 20 pounds for women with overweight and obesity.

## Sample Meal Plant for Pregnant Women With Diabetes

### Breakfast

- ½ cup old-fashioned rolled oats
- ½ cup unsweetened soy milk
- 1 cup blueberries
- 1 slice of rye toast with 2 tablespoons peanut butter

### Lunch

- 1 cup black bean chili
- ½ cup cooked quinoa
- 1 cup kale salad with 1 tablespoon of tahini and 1 tablespoon of lemon juice
- Orange

### Dinner

- Veggie burger on a whole-wheat bun with lettuce, tomato, and onion
- 1 cup roasted Sweet Potato Fries (See recipe sidebar on next page.)
- 1 cup steamed broccoli
- ¾ cup grapes

### Snack

- 2 tablespoons of hummus with 1 cup of carrots
- Soy yogurt with ½ ounce (11) almonds and 2 tablespoons of raisins
- ½ pumpernickel bagel with 2 tablespoons of almond butter
- Lentil Cucumber Salad (See recipe sidebar below.)

## Lentil Cucumber Salad

This colorful lentil salad is easy to make and packed with protein and fiber! Pair it with whole-grain pita and fruit.

4 servings

### Ingredients:

- 1 cup brown or green lentils
- 1 cup tomato, diced
- 1 cup cucumber, peeled and diced
- 1 cup orange or red pepper, cubed
- 1 clove garlic, finely chopped
- 1 tablespoon olives, chopped
- 1 tablespoon fresh basil, chopped
- ¼ cup balsamic vinegar



### Directions:

Clean the lentils to make sure they have no stones and pour into a large pot of water.

Boil gently for 20 minutes or until tender. Strain and let cool on a tray in the refrigerator.

In a large bowl, mix the lentils with the remaining ingredients. Season with salt and pepper.

Serve the salad cold.

*Optional:* Serve with a gluten-free pita.

### Nutrition Facts:

Per serving: Calories: 198 • Fat: 1.0 g • Saturated fat: 0.2 g • Calories from fat: 4% • Cholesterol: 0 mg • Protein: 13.2 g • Carbohydrate: 36.0 g • Sugar: 6.3 g • Fiber: 9.9 g • Sodium: 37 mg • Calcium: 53 mg • Iron: 5.0 mg • Vitamin C: 40.4 mg • Beta-Carotene: 1,966 mcg • Vitamin E: 0.6 mg

Source: Dora Stone, chef and photographer, founder of Mmmole.com and DorasTable.com

## Sweet Potato Fries

These seasoned sweet potatoes are the perfect nutritious snack or side dish to any meal.

2-3 servings

### Ingredients:

- 2 cups sweet potatoes, french-fry-size pieces
- Nonstick cooking spray,
- ¼ teaspoon salt
- 3 cloves garlic, minced
- 1 tablespoon parsley, diced
- ½ teaspoon cracked pepper
- 1 teaspoon fresh thyme
- ¼ teaspoon smoked paprika
- 1 pinch ground cumin
- 1 pinch cayenne pepper
- 1 pinch allspice



### Directions:

Spray the sweet potato slices with nonstick cooking spray and then toss them in the salt, garlic, parsley, and spices.

Bake the fries at 375 F for 30 to 40 minutes, and then finish them under the broiler for 5 minutes.

*Optional:* Serve with maple syrup or dipping sauce of your choice.

### Nutrition Facts:

Per serving: Calories: 70 • Fat: 0.2 g • Saturated Fat: 0.05 g • Calories from Fat: 3% • Cholesterol: 0 mg • Protein: 2 g • Carbohydrate: 16 g • Sugar: 5 g • Fiber: 3 g • Sodium: 223 mg • Calcium: 38 mg • Iron: 0.8 mg • Vitamin C: 17 mg • Beta-Carotene: 8,129 mcg • Vitamin E: 0.6 mg

## References:

1. American Diabetes Association. 14. Management of diabetes in pregnancy: Standards of medical care in diabetes-2020. *Diabetes Care*. 2020;43(Suppl 1):S183-S192.
2. Dirar AHM, Doupis J. Gestational diabetes from A to Z. *World J Diabetes*. 2017;8:489-506.
3. Duarte-Gardea MO, Gonzales-Pacheco DM, Reader DM, et al. Academy of Nutrition and Dietetics gestational diabetes evidence-based nutrition practice guideline. *J Acad Nutr Diet*. 2018;118:1719-1942.
4. American Diabetes Association. 2. Classification and diagnosis of diabetes: Standards of medical care in diabetes-2020. *Diabetes Care*. 2020;43(Suppl 1):S14-S31.
5. Kampmann U, Madsen LR, Skajaa GO, Iversen DS, Moeller N, Oversen P. Gestational diabetes: A clinical update. *World J Diabetes*. 2015;6:1065-1072.
6. Moreno-Castilla C, Hernandez M, Bergua M, et al. Low-carbohydrate diet for the treatment of gestational diabetes mellitus: A randomized controlled trial. *Diabetes Care*. 2013;36:2233-2238.
7. Romon M, Nuttens MC, Vambergue A, et al. Higher carbohydrate intake is associated with decreased incidence of newborn macrosomia in women with gestational diabetes. *J Am Diet Assoc*. 2001;101:897-902.
8. Hernandez TL, Mande A, Barbour LA. Nutrition therapy within and beyond gestational diabetes. *Diabetes Res Clin Pract*. 2018;145:39-50.
9. Melina V, Craig W, Levin S. Position of the Academy of Nutrition and Dietetics: Vegetarian diets. *J Acad Nutr Diet*. 2016;116:1970-1980.
10. Pistollato F, Cano SS, Elio I, et al. Plant-based and plant-rich diet patterns during gestation: Beneficial effects and possible shortcomings. *Adv Nutr*. 2015;6:581-591.
11. Barnard ND, Cohen J, Jenkins DJ, et al. A low-fat vegan diet improves glycemic control and cardiovascular risk factors in a randomized clinical trial in individuals with type 2 diabetes. *Diabetes Care*. 2006;29:1777-1783.
12. McMacken M, Shah S. A plant-based diet for the prevention and treatment of type 2 diabetes. *J Geriatr Cardiol*. 2017;14:342-354.
13. Reader DM. Nutrition therapy for pregnancy, lactation, and diabetes. In Franz MJ, Evert AB. *American Diabetes Association Guide to Nutrition Therapy for Diabetes*. 2nd ed. Alexandria, VA: American Diabetes Association; 2012.
14. Chen Z, Qian F, Liu G, et al. Prepregnancy plant-based diet and the risk of gestational diabetes mellitus: A prospective cohort study of 15,999 women. Abstract presented at: 80th American Diabetes Association Scientific Sessions; June 12-16, 2020; online.
15. Zhang C, Liu S, Solomon CG, Hu FB. Dietary fiber intake, dietary glycemic load, and the risk of gestational diabetes. *Diabetes Care*. 2006;29:2223-2230.
16. Zhang C, Schulze MB, Solomon CG, Hu FB. A prospective study of dietary patterns, meat intake and the risk of gestational diabetes mellitus. *Diabetologia*. 2006;49:2604-2613.
17. Bo S, Menato G, Lezo A, et al. Dietary fat and gestational hyperglycemia. *Diabetologia*. 2001;44:972-978.
18. Liang Y, Gong Y, Zhang X. Dietary protein intake, meat consumption, and dairy consumption in the year preceding pregnancy and during pregnancy and their associations with risk of gestational diabetes mellitus: A prospective cohort study in Southwest China. *Front Endocrinol*. 2018;9:596-605.
19. Food and Nutrition Board, Institute of Medicine. *Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc*. 2nd ed. Washington, DC: National Academy Press; 2000.
20. Dal S, Séverine S. The protective effect of antioxidants consumption on diabetes and vascular complications. *Diseases*. 2016;4:24-75.
21. Dinu M, Abbate R, Gensini GF, et al. Vegetarian, vegan diets and multiple health outcomes: A systematic review with meta-analysis of observational studies. *Crit Rev Food Sci Nutr*. 2017;57:3640-3649.

This fact sheet is not intended as a comprehensive program for diabetes. Be aware that a change in diet can produce big results. For some, there is a risk that low blood sugar can occur if diabetes medications are not lowered or eliminated. If you have diabetes, consult your health care provider and tailor a program for your needs.