

# Hypertensive Disorders of Pregnancy and Gestational Diabetes Script

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## Hypertensive Disorders of Pregnancy and Gestational Diabetes

In this module, we will be discussing hypertensive disorders of pregnancy, including pregnancy induced hypertension and preeclampsia. We will also discuss Gestational Diabetes as well as nutrition solutions related to these issues.

### Hypertensive Disorders

We will begin by discussing hypertensive disorders in pregnancy.

### Hypertensive Disorders

There are at least five distinct categories of hypertension and related disorders that occur during pregnancy. These categories are preeclampsia/eclampsia, chronic hypertension, preeclampsia superimposed upon chronic hypertension, gestational hypertension, and transient hypertension. Each of these will be discussed individually throughout the module, with recommendations based on best practices provided.

### Criteria for Diagnosis of Hypertension

Blood pressure is the force of blood on the walls of the arteries. Systolic blood pressure is measured when the ventricles are contracting while diastolic pressure is measured when the ventricles are relaxed. Normal blood pressure is typically 120/80 mm Hg. The general definition of high blood pressure in adults is a systolic BP > 140 mg HG or a diastolic blood pressure > 90 mm Hg. These criteria should be used for women throughout pregnancy.

### Chronic Hypertension

Chronic hypertension often exists prior to pregnancy and continues throughout pregnancy. It may not be noticed until the second trimester of pregnancy if prenatal care is delayed or if women have suffered from prolonged nausea and vomiting or morning sickness. If hypertension is diagnosed in early pregnancy and persists past 6 weeks postpartum, it would be considered to be a chronic health condition.

### Gestational Hypertension

Gestational hypertension, or pregnancy induced hypertension, is a temporary diagnosis used during pregnancy until a more specific diagnosis can be assigned postpartum. Gestational

hypertension is differentiated from chronic hypertension when it occurs for the first-time during pregnancy and resolves within 6-12 weeks postpartum. Also, there is no proteinuria detected in the case of gestational hypertension. If the blood pressure remains elevated after pregnancy, then it would be considered a chronic condition. The physiological stress of pregnancy can lead to transient gestational hypertension and may be a risk factor for hypertension later in life.

## Gestational Hypertension

Women who are at highest risk for all hypertensive disorders of pregnancy include: underweight women who do not gain adequate weight by the middle to end of the 2nd trimester of pregnancy, women from low socioeconomic status backgrounds, which may be a result of stress or other underlying health issues, and women that are at a high risk for hypertension due to race, ethnicity, and family history of hypertension.

Gestational hypertension can precede preeclampsia and then develop into preeclampsia by 30 weeks of pregnancy.

## Preeclampsia

Preeclampsia is a condition that affects several major organ systems in the body including the cardiovascular and renal systems. The etiology of the disease is still unclear, but it is believed that the placenta “causes” preeclampsia. Abnormal placentation results in reduced maternal-fetal exchange and placental hypoxia (oxygen deprivation). This hypoxia then leads to several biochemical changes which lead to preeclampsia. There is also research into possible gene and immune links to preeclampsia. It generally occurs after the middle of the 2nd trimester but can occur earlier in some individuals.

Preeclampsia is distinguished from hypertension by the presence of protein in the urine which is called proteinuria and does not occur with chronic hypertension. Protein in the urine can also occur during urinary tract infections, so it is important to quantify the amount of protein in the urine and to rule out infections when considering the presence of preeclampsia.

## Preeclampsia Diagnosis

Preeclampsia occurs when the systolic blood pressure is greater than 160 or the diastolic blood pressure is greater than 110. This is accompanied by the presence of moderate amounts protein in the urine (greater than .3 grams in 24 hours).

Retention of fluid (edema) is common in preeclampsia. A large, sudden weight gain that is accompanied by significant edema and elevated blood pressure is indicative of preeclampsia. As preeclampsia progresses, women may experience headaches or visual problems and occasionally gastric pain.

Young primiparous women have been found to be at higher risk for preeclampsia in some, but not all, studies. These young women are often underweight or are at a low socioeconomic level, which makes it difficult to determine if it is age or other factors that convey the increased risk.

Figure reference: <https://slu.adam.com/content.aspx?productid=117&pid=2&gid=17270>

## Preeclampsia Superimposed Upon Chronic Hypertension

Preeclampsia can occur in women with no prior history of hypertension (rapid onset) or it can occur in women who have had chronic hypertension prior to or earlier in pregnancy. Generally, the latter will be characterized by a large, rapid weight gain, sudden increase in blood pressure and protein in the urine.

## Clinical Implications of Preeclampsia

Preeclampsia may or may not proceed to full blown eclampsia. Mild cases of preeclampsia may persist for weeks and end in the early delivery of the infant to resolve the health issues associated with it. In other women, preeclampsia quickly progresses to eclampsia. For this reason, it is important to treat even suspected cases of preeclampsia aggressively to prevent maternal and fetal morbidity and mortality.

## Preeclampsia

The biochemical and physiological changes seen prior to preeclampsia include high homocysteine levels, elevated triglyceride, and LDL cholesterol levels. Women with preeclampsia appear to be in a state of oxidative stress prior to pregnancy and then is exacerbated by pregnancy. These are women who often have other risk factors for Cardiovascular and/or renal disease and are at high risk for these problems later in life. These risk factors include obesity, high triglycerides, pre-existing hypertension, insulin resistance, diabetes, and metabolic syndrome. Women who are hypertensive in one pregnancy are at higher risk for hypertension in another pregnancy.

## Management of Preeclampsia

Preeclampsia has no known cure. To manage preeclampsia hospitalization or home management are dependent on the severity. Careful management of women with gestational hypertension or mild pre-eclampsia is warranted and can often be delivered via home visits or frequent outpatient visits.

Pre-eclampsia may result in the early delivery of the infant when it becomes severe or progresses rapidly. Hospitalization is recommended in order to closely assess maternal and fetal health. With severe cases, the woman may be hospitalized for the duration of pregnancy in order to closely manage the pregnancy.

## Indications for Delivery

In mothers with preeclampsia, the medical indications for early delivery of the infant are listed here and include:

Gestation age 38 weeks; physicians will try to have women with pre-eclampsia go to at least 37 weeks gestation

Other indications for early delivery are Platelet count < 100,000 cells/millimeter cubed; Progressive deterioration in liver and renal function; Suspected abruptio placentae, in which the placenta prematurely separates from the wall of the uterus; Persistent severe headaches, visual changes, nausea, epigastric pain or vomiting. Delivery should be based on maternal and fetal conditions as well as gestational age.

## Eclampsia

Eclampsia is pregnancy induced hypertension resulting in grand mal seizures. It can occur in women with pre-eclampsia and is diagnosed as eclampsia if the seizures cannot be attributed to other causes. Convulsions usually occur after mid-pregnancy and may occur postpartum. Symptoms of pregnancy-induced hypertension that increase concern for seizure are dizziness, headache, visual disturbances, facial edema, anorexia, nausea, vomiting. Eclampsia often results in fetal death and may also be fatal to the mother if not treated promptly.

## Dietary Management

Dash diet or the “no added salt” diet are ways to manage preeclampsia during pregnancy. Interconceptional care should also include dietary counseling to follow the DASH diet after pregnancy to reduce the risk of chronic hypertension.

The basis of this diet is an intake of 8 or more servings of fruit and vegetables each day (to provide adequate potassium, vitamins, minerals, and fiber). Two or more servings of dairy products per day (to provide adequate calcium, phosphorous, magnesium and other vitamins/minerals); moderate amounts of protein (6-12 oz per day); and at least 6 servings of grain products, with half or more coming from whole grain sources.

If a "no added salt" diet was used successfully prior to pregnancy, then it may be continued by the health care provider. A "no added salt" diet excludes the use of the saltshaker at the table and during cooking. Additionally, higher sodium foods should be avoided such as: cured meats, lunch meats, canned soups and vegetables and many convenience foods.

Sodium should not be restricted beyond the “no added salt” guidelines unless under close medical supervision. Blood volume expansion is an important aspect of pregnancy. Excessive restriction of sodium in the diet can lead to electrolyte imbalances and issues with adequate fluid expansion.

Sources of potassium, magnesium and calcium should be encouraged throughout pregnancy and afterward in women with hypertensive disorders. These minerals may help to modulate blood pressure and are important for the growing fetus.

## Dietary Strategies for Prevention

Research studies have looked at nutrient supplementation as a means of modifying risk of gestational hypertension and/or preeclampsia. Many nutrient supplementation studies showed no effect on development on risk of developing hypertensive disorders. However, calcium and magnesium have shown positive results.

Several studies have demonstrated that calcium supplementation can reduce the risk of hypertensive disorders in pregnancy by 20%-50%. The largest effect for calcium is found among young women with very low intakes of calcium prior to pregnancy. Supplementation of 2 grams of calcium per day has been found to be effective in these women.

Magnesium supplementation has also been found to reduce the risk of hypertensive disorders in pregnancy by 10%-40%. Supplementation with 350-500 mg per day has been found to be effective in women who were at high risk of hypertensive disorders. Magnesium appears to work better as a treatment for hypertensive disorders than as a preventive nutrient.

## Dietary Strategies for Prevention

Other studies have shown that DHA and or fish oil supplements and supplementation of vitamins C and E are also beneficial. DHA and/or fish oil supplements have been investigated in several large studies of pregnancy women. Most studies have shown moderate reductions of 10%-25% for risk of gestational hypertension for fish oil supplements and 10%-50% reductions in risk for DHA supplements. Other studies have found no effect.

Vitamins C and E are antioxidant nutrients that have been found to be the most effective nutrients at reducing the risk of gestational hypertensive disorders. Risk reductions of 40%-75% have been found in clinical trials using both nutrients.

## Gestational Diabetes

We will now discuss Gestational Diabetes Mellitus and the ways in which nutrition can be utilized to manage the issue.

## Gestational Diabetes

Gestational diabetes is defined as carbohydrate intolerance of variable severity with onset or first recognition during pregnancy. This definition applies regardless of whether insulin is used for treatment, or the condition persists after pregnancy. Women with diabetes prior to pregnancy are not classified as having GDM Prevalence (existing cases): In a given population, the prevalence or existing cases of GDM is in direct proportion to the incidence of type 2 diabetes. In terms of the incidence, or new cases gestational diabetes, occurs in about 2-10% of all pregnancies.

## Risk Factors

Women at greatest risk for developing gestational diabetes include those who are older than 25 years of age, overweight (particularly those who are obese since risk increases as weight

increases). Others at risk are women who have a first degree relative with type 2 diabetes, have experienced prior glucose intolerance, have a history GDM during previous pregnancy or of delivering large-for-gestational age infants, or are members of an ethnic group with a high incidence of type 2 diabetes.

## Metabolic Influences During Pregnancy

Pregnancy is an insulin-resistant state that progresses throughout pregnancy. Human placental lactogen, prolactin, estrogen and cortisol are pregnancy-associated hormones that cause insulin resistance. This insulin resistance causes insulin secretion to increase two to threefold in response to food. Women unable to compensate by secreting more insulin will develop gestational diabetes.

## Perinatal Implications

Under-treated or untreated GDM results in higher risk of morbidity and mortality for mom and fetus. Complications for infants include macrosomia (large-for-gestational-age infants), postpartum hypoglycemia, hypocalcemia, polycythemia, hyperbilirubinemia.

Risks to the mother include development of pregnancy induced hypertension and requiring a cesarean delivery. Poor glycemic control is also related to increased risk for developing pre-eclampsia and increased risk for preterm labor

Figure reference: <https://slu.adam.com/content.aspx?productid=117&pid=2&gid=19724>

## Risk Assessment

Every woman should have a risk assessment at her first prenatal visit. Women with fasting hyperglycemia or abnormal carbohydrate intolerance in the 1st trimester are suspected to have undiagnosed diabetes. If a woman is deemed to be at high risk, then the oral glucose challenge (OGTT- Oral Glucose Tolerance Test) should be administered at first prenatal visit. High risk women not found to have gestational diabetes mellitus, and average-risk women, should undergo testing again between the 24th and 28th weeks of gestation.

## Nutrition Management

Nutrition Therapy for gestational diabetes mellitus is primarily a carbohydrate-controlled meal plan that promotes optimal nutrition with appropriate calorie intake, weight gain, and normoglycemia. The plan also promotes the absence of hyperglycemia, hypoglycemia, and ketonemia or ketones in the blood. When counseling clients or patients, be sure to strongly oppose the use of hypocaloric diets in pregnancy, even for overweight and obese women. In addition to nutrition management, some women may also require the use of insulin.

## Sources of Carbohydrates

Sources of carbohydrates in the diet include grains, starchy vegetables, fruits, milk, and desserts.

## Example Food Plan

A typical food plan for gestational diabetes mellitus recommends eating 3 small-to-moderate meals and 2-4 snacks per day. A bedtime snack for all women is recommended in order to prevent starvation ketosis overnight.

Starvation ketosis is an abnormal increase of ketone bodies in the blood caused by breakdown of fat for energy, usually when there is not enough glucose. Glucose control is achieved with carbohydrate counting. Typically, women who have gestational diabetes meet with a diabetes educator at their medical health care clinic to go over the food plan. On this slide is an example food plan that women with gestational diabetes may follow.

Click on the link if you would like to visit the American Diabetes Association website for more information.

Link: <https://diabetes.org/healthy-living/recipes-nutrition/understanding-carbs>

## Sugar Substitutes and Pregnancy

Sugar substitutes acceptable for maternal use during pregnancy are Sunette and Splenda. The level of phenylalanine in Aspartame is just below the level that would cause neurologic problems, but mothers should limit their intake of this sweetener. Mothers may want to avoid using saccharin due to some concern that it crosses the placenta and has slow fetal clearance.

## Exercise for Management

Women should be aware that exercise may help control blood glucose levels, especially after meals. It's recommended to speak with your health care provider about appropriate exercise intensity while pregnant.

## Common Clinical Outcomes

This slide details common clinical complications in women who have been instructed in nutrition and exercise management of gestational diabetes. Also listed are possible causes of these complications.

Causes of elevated postprandial (post meal) blood glucose include overeating, high carbohydrate intake, inactivity, bedrest, tocolytic drugs (which are medications commonly used to prevent preterm labor), and illness.

Causes of positive fasting ketones include under eating, skipping meals or snacks, avoiding insulin, increased activity.

Lastly, causes of weight loss include under eating, nausea and/or vomiting, and skipping meals or snacks.

## Monitoring Postpartum

After a woman gives birth, gestational diabetes usually goes away, and blood glucose returns to normal. However, all women who had GDM should undergo follow-up screening for development of DM or pre-diabetes. 40% of women with GDM later advance to Type 2 Diabetes.

## Future Pregnancies

Gestational diabetes recurs in greater than 90% of women. If a woman is diagnosed with gestational diabetes, the earlier the intervention, the better. If gestational diabetes is not under control with diet and exercise alone, she may need to move to insulin by 20-24 weeks. Gestational diabetes is a good opportunity for women to learn about good nutrition; make changes in food intake that can be continued after delivery; begin to walk and be more physically active.

## Test Your Knowledge

Okay, now is time to test your knowledge!

### Question 1

Question 1: Preeclampsia usually occurs after the 20th week gestation.

A. True B. False

Answer: A. True

### Question 2

Question 2: What are signs of preeclampsia?

A. Edema B. High blood pressure C. Sudden and significant weight gain D. All of the above

Answer: D. Signs of preeclampsia are high blood pressure accompanied by the presence of moderate amounts of protein in the urine, retention of fluid (edema) and large, sudden weight gain.

### Question 3

Question 3: The DASH diet promotes the intake of 8 or more servings of fruits and vegetables each day to provide adequate potassium, vitamins, minerals, and fiber.

A. True B. False

Answer: A. True

### Question 4



Question 4: What is not a complication associated with gestational diabetes?

A. Large-For-Gestational Age B. Increase risk of mortality C. Postpartum hypoglycemia D. Low birth weight

Answer: D. Low birth weight infant is not a complication associated with gestational diabetes.

## Question 5

Question 5: What is the first strategy used for managing gestational diabetes?

A. Carbohydrate-controlled diet and exercise B. Bed rest C. Insulin D. Medication

Answer: A. Following a carbohydrate-controlled diet and exercising (as recommended by the health care provider) is the first strategy to manage gestational diabetes.

## Quiz Result

Results shown.

## This Completes the Module

This completes the module Hypertensive Disorders of Pregnancy and Gestational Diabetes, presented by the Minnesota Department of Health WIC Program.

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