

## Preeclampsia

### Description

Preeclampsia is a complication of pregnancy in which affected women develop high blood pressure (hypertension); they can also have abnormally high levels of protein in their urine (proteinuria). This condition usually occurs in the last few months of pregnancy and often requires early delivery of the infant. However, this condition can also appear shortly after giving birth (postpartum preeclampsia).

Many women with mild preeclampsia do not feel ill, and the condition is often first detected through blood pressure and urine testing in their doctor's office. In addition to hypertension and proteinuria, signs and symptoms of preeclampsia can include excessive swelling (edema) of the face or hands and a weight gain of more than 3 to 5 pounds in a week due to fluid retention. Affected women may also experience headaches, dizziness, irritability, shortness of breath, a decrease in urination, upper abdominal pain, and nausea or vomiting. Vision changes may develop, including flashing lights or spots, increased sensitivity to light (photophobia), blurry vision, or temporary blindness.

In many cases, symptoms of preeclampsia go away within a few days after the baby is born. In severe cases, however, preeclampsia can damage the mother's organs, such as the heart, liver, and kidneys, and can lead to life-threatening complications. Extremely high blood pressure in the mother can cause bleeding in the brain (hemorrhagic stroke). The effects of high blood pressure on the brain (hypertensive encephalopathy) may also result in seizures. If seizures occur, the condition is considered to have worsened to eclampsia, which can result in coma. About 1 in 200 women with untreated preeclampsia develop eclampsia. Eclampsia can also develop without any obvious signs of preeclampsia.

Between 10 and 20 percent of women with severe preeclampsia develop another potentially life-threatening complication called HELLP syndrome. HELLP stands for hemolysis (premature red blood cell breakdown), elevated liver enzyme levels, and low platelets (cells involved in blood clotting), which are the key features of this condition.

Severe preeclampsia can also affect the fetus, with impairment of blood and oxygen flow leading to growth problems or stillbirth. Infants delivered early due to preeclampsia may have complications associated with prematurity, such as breathing problems caused by underdeveloped lungs.

Women who have had preeclampsia have approximately twice the lifetime risk of heart disease and stroke than do women in the general population. Researchers suggest that preeclampsia, heart disease, and stroke may share common risk factors. Women who have diseases such as obesity, hypertension, heart disease, diabetes, or kidney disease before they become pregnant have an increased risk of developing preeclampsia. Preeclampsia is most likely to occur in a woman's first pregnancy, although it can occur in subsequent pregnancies, particularly in women with other health conditions.

## **Frequency**

Preeclampsia is a common condition in all populations, occurring in 5 to 8 percent of pregnancies. It occurs more frequently in women of African or Hispanic descent than it does in women of European descent.

## **Causes**

The specific causes of preeclampsia are not well understood. In pregnancy, blood volume normally increases to support the fetus, and the mother's body must adjust to handle this extra fluid. In some women the body does not react normally to the fluid changes of pregnancy, leading to the signs and symptoms of preeclampsia.

The reasons for these abnormal reactions to the changes of pregnancy vary in different women and may differ depending on the stage of the pregnancy at which the condition develops. Studies suggest that preeclampsia is related to a problem with the placenta, the link between the mother's blood supply and the fetus. If there is an insufficient connection between the placenta and the arteries of the uterus, the placenta does not get enough blood. The placenta responds by releasing a variety of substances, including chemicals that affect the lining of blood vessels (the vascular endothelium). By mechanisms that are unclear, the mother's blood vessels constrict abnormally, causing hypertension. These constricted blood vessels also affect other organs, leading to the other signs and symptoms of preeclampsia. In the kidneys, the constricted blood vessels result in abnormal release of proteins in the urine.

Researchers are studying whether variations in genes involved in fluid balance, the functioning of the vascular endothelium, or placental development affect the risk of developing preeclampsia or its severity. Additional genes with no known function in pregnancy have also been associated with preeclampsia risk.

Many other factors likely also interact with genetic factors and contribute to the risk of developing this complex disorder. These risk factors include a pregnancy with twins or higher multiples, being older than 35 or younger than 20, and preexisting health conditions. Socioeconomic status and ethnicity have also been associated with preeclampsia risk, and nutritional and other environmental factors are thought to affect the likelihood of developing this disorder. The incidence of preeclampsia in the United States has increased by 30 percent in recent years, which has been attributed in part to an increase in older mothers, the increased prevalence of hypertension and obesity, and multiple births resulting from the use of assisted reproductive technologies.

## **Inheritance**

Many cases of preeclampsia occur in women with no known history of the disorder in their families, and these cases do not seem to be inherited. Some families have a strong family history of the disorder; however, the inheritance pattern is unknown. The tendency to develop preeclampsia can be affected by genetic variations carried by either parent, and genetic variations carried by the unborn child may also play a role.

## **Other Names for This Condition**

- Gestational proteinuric hypertension
- Pre-eclampsia
- Pregnancy-induced hypertension
- Toxemia of pregnancy

## **Additional Information & Resources**

### Genetic Testing Information

- Genetic Testing Registry: Preeclampsia (<https://www.ncbi.nlm.nih.gov/gtr/conditions/C0032914/>)
- Genetic Testing Registry: Preeclampsia/eclampsia 4 (<https://www.ncbi.nlm.nih.gov/gtr/conditions/C1836255/>)
- Genetic Testing Registry: Preeclampsia/eclampsia 5 (<https://www.ncbi.nlm.nih.gov/gtr/conditions/C3281288/>)

### Patient Support and Advocacy Resources

- National Organization for Rare Disorders (NORD) (<https://rarediseases.org/>)

### Clinical Trials

- ClinicalTrials.gov (<https://clinicaltrials.gov/search?cond=%22Preeclampsia%22>)

### Catalog of Genes and Diseases from OMIM

- PREECLAMPSIA/ECLAMPSIA 1; PEE1 (<https://omim.org/entry/189800>)
- PREECLAMPSIA/ECLAMPSIA 2; PEE2 (<https://omim.org/entry/609402>)
- PREECLAMPSIA/ECLAMPSIA 3; PEE3 (<https://omim.org/entry/609403>)
- PREECLAMPSIA/ECLAMPSIA 4; PEE4 (<https://omim.org/entry/609404>)
- PREECLAMPSIA/ECLAMPSIA 5; PEE5 (<https://omim.org/entry/614595>)

## Scientific Articles on PubMed

- PubMed (<https://pubmed.ncbi.nlm.nih.gov/?term=%28Pre-Eclampsia%5BMAJR%5D%29+AND+review%5Bpt%5D+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+360+days%22%5Bdp%5D>)

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