# THE CLINICAL SIGNIFICANCE OF HOMOCYSTEINE LEVELS IN PREGNANT WOMEN

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**Abstract:** Homocysteine is a non-protein amino acid involved in methionine metabolism, and its elevated levels during pregnancy have been associated with multiple obstetric complications. This thesis explores the clinical relevance of hyperhomocysteinemia in pregnant women, focusing on its link to preeclampsia, fetal growth restriction (FGR), small-for-gestational-age infants (SGA), and placental insufficiency. Scientific literature indicates that elevated homocysteine levels can impair vascular endothelial function, increase oxidative stress, and disrupt placental circulation, thereby negatively impacting pregnancy outcomes. The findings emphasize the importance of early screening and intervention through nutritional supplementation—particularly folic acid and vitamins B6 and B12—to reduce the risks associated with high homocysteine levels and promote healthy maternal and fetal development.

**Keywords:** Homocysteine, pregnancy, preeclampsia, fetal growth restriction, placental insufficiency, maternal health, hyperhomocysteinemia, vitamins B6 and B12, folic acid

Homocysteine is a sulfur-containing amino acid that is produced as an intermediate in the metabolism of methionine. During pregnancy, numerous physiological changes occur in the maternal body, and maintaining biochemical balance is essential for the health of both the mother and the fetus. Recent studies have shown that elevated levels of homocysteine in pregnant women—referred to as hyperhomocysteinemia—are significantly associated with various obstetric complications. Among the most common complications linked to high homocysteine levels are preeclampsia, fetal growth restriction (FGR), small-for-gestational-age infants (SGA), placental insufficiency, spontaneous abortion, and preterm labor.

The pathogenic mechanism of homocysteine involves endothelial dysfunction, oxidative stress, impaired placental blood flow, and hypercoagulability, all of which can negatively impact fetal development. In normal pregnancy, homocysteine levels tend to decrease due to hemodilution and increased demand for vitamins such as folic acid and vitamins B6 and B12. However, if the mother has deficiencies in these vitamins or underlying genetic factors, homocysteine may accumulate in the blood, leading to adverse outcomes.

Scientific evidence suggests that homocysteine levels above 10–15 µmol/L in early pregnancy significantly increase the risk of preeclampsia and other complications. This highlights the importance of early screening and monitoring of homocysteine levels during antenatal care. Moreover, nutritional interventions, such as adequate intake of folate and B vitamins, can help reduce homocysteine concentrations and improve maternal-fetal outcomes.

In conclusion, homocysteine plays an important role in pregnancy-related pathologies. Identifying and addressing elevated homocysteine levels early in pregnancy may be a valuable strategy for preventing

serious maternal and fetal complications. Further research and clinical guidelines are needed to integrate homocysteine screening into routine prenatal care.

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