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Review Article

**THE RELATIONSHIP BETWEEN HEMOGLOBIN AND  
HEMATOCRIT IN THE FIRST TRIMESTER OF PREGNANCY AND  
THE INCIDENCE OF PREECLAMPSIA****Fateme parooei<sup>1</sup>, Mahmood Anbari<sup>2</sup>, Morteza Salarzaei<sup>1\*</sup>**<sup>1</sup>Medical Student, Student Research Committee, Zabol University of Medical Sciences, Zabol, Iran<sup>2</sup>Zabol University of Medical Sciences, Zabol, Iran**Abstract:**

**Introduction:** Pregnancy and childbirth are among the most important events in every woman's life. Although pregnancy is not a disease and is a physiological and natural process, it may be followed with complications, and pregnancy cares can prevent the incidence of many problems.

**Methods:** In this review article, the databases Medline, Cochrane, Science Direct, and Google Scholar were thoroughly searched to identify the relationship between hemoglobin and hematocrit in the first trimester of pregnancy and the incidence of preeclampsia. In this review, the papers published until early January 2017 that were conducted to study the relationship between hemoglobin and hematocrit in the first trimester of pregnancy and the incidence of preeclampsia were selected.

**Results:** Hemoglobin hematocrit test is one of the common tests of pregnancy. Hematocrit includes the ratio of the volume of erythrocytes to the total volume of blood that is shown as a percentage or a decimal fraction.

**Discussion and conclusion:** Hypertensive disorders during pregnancy is one of the most important complications of pregnancy that account for three most important causes of maternal mortality together with hemorrhage and infection.

**Key words:** hemoglobin · hematocrit · first trimester · pregnancy · preeclampsia

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**INTRODUCTION:**

Pregnancy and childbirth are among the most important events in every woman's life (1). Although pregnancy is not a disease and is a physiological and natural process, it may be followed with complications, and pregnancy cares can prevent the incidence of many problems (2). One of the common and risky complications of pregnancy is preeclampsia. This disease accounts for one of the main causes of maternal and fetal mortality and it is diagnosed with symptoms such as increased blood pressure and proteinuria (3). The prevalence of this disease is 5-7% in the world, and it is 20% in developing countries (4). Although costs of this disease are high for both families and health centers, there is no treatment strategy except for selected labor and no medical intervention has been found for delaying the onset of this disease (5). Although some risk factors such as increased fibrinogen concentration and the history of preeclampsia have been reported for this disease, this disease is only diagnosed with its own clinical presentations, and it is often diagnosed late (6). Increased hemoglobin and hematocrit concentration in women suffering from preeclampsia can be resulted from increased haematopoiesis related to the disrupted oxygenation mechanism in the plasma or secretion of placental factors such as Actin A (7).

**METHODS:**

In this review article, the databases Medline, Cochrane, Science Direct, and Google Scholar were thoroughly searched to identify The relationship between hemoglobin and hematocrit in the first trimester of pregnancy and the incidence of preeclampsia. In this review, the papers published until early January 2017 that were conducted to study The relationship between hemoglobin and hematocrit in the first trimester of pregnancy and the incidence of preeclampsia were selected.

**FINDINGS:**

Hemoglobin hematocrit test is one of the common tests of pregnancy. Hematocrit includes the ratio of the volume of erythrocytes to the total volume of blood that is shown as a percentage or a decimal fraction (8). Hematocrit is measured by macro, micro, or indirect centrifuging by the result of multiplying the average blood volume by the number of red blood cells (9). Based on the existing evidences of the pregnancies resulted in preeclampsia, the vascular wall of the spiral arteries is muscular and thick and the invasion into the trophoblast is incomplete (10). Thus, the *uterine-placental blood flow is disordered and it results in initial placental hypoxia and oxidative stress (11). Oxidative stress brings about a trend that is associated with pathogenesis of preeclampsia.* However, in natural pregnancies, these vessels

swell and become bag-like, and bring about an increase in uterine blood flow by 10 times through reducing peripheral resistance (12). Moreover, by the progress of natural pregnancy, we will have 25% increase of red cells mass and 40% increase of plasma mass; this will increase *uterine-placental blood flow by reducing hematocrit and blood viscosity.*

**DISCUSSION AND CONCLUSION:**

Hypertensive disorders during pregnancy is one of the most important complications of pregnancy that account for three most important causes of maternal mortality together with hemorrhage and infection (13). Every year, 75 thousand maternal deaths occur owing to hypertensive disorders. Although numerous studies have been conducted on this disease, its cause is still unknown. Although some risk factors have been reported for preeclampsia, this disease is only diagnosed with its own clinical presentations and it is often diagnosed late (14). Over the past few years, a special attention has been given to risk factors to prevent preeclampsia. This relationship does not depend on age, weight, and other risk factors of preeclampsia. Thus, giving due attention to hematocrit levels is likely to be helpful for identifying individuals susceptible to preeclampsia and conducting preventive measures.

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