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Review Article

A Review on Pregnancy and Haematology

Obeagu Emmanuel Ifeanyi*

Department of University Health Services, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria
*Corresponding author: *emmanuelobeagu@yahoo.com*

Abstract

Pregnancy is a welcomed development in many families especially among married persons. It is an enjoyable moment and also a challenging time because each pregnancy presents with different changes which can also occur in haematological feature of the pregnant woman. This paper discussed pregnancy and haematological observations. This will open new dimensions among researchers and those who are involved in the care of pregnant women.

Keywords: Pregnancy, Fertilization, Haematological observations

Pregnancy and haematological observations

Pregnancy or cyesis is the fertilization and development of one or more embryo or foetus, in a woman's uterus. An embryo is the developing offspring during the first 8 weeks following conception and subsequently the term foetus is used henceforth until birth. Although pregnancy begins with implantation, the process leading to pregnancy occurs earlier as the result of female gamete or oocyte, merging with the male gamete, spermatozoon. In medicine, this process is referred to as fertilization, in lay terms; it is more commonly known as "conception". Conception is achieved through sexual intercourse or assisted reproductive technology (WHO, 2009). After the point of fertilization, the fused product of the female and male gamete is referred to as zygote or fertilized egg. In women who have a menstrual cycle length of four weeks, childbirth usually occurs approximately 40 weeks from the start of the last normal menstrual period (LNMP).

However, pregnancy being a physiological process is subject to variation and any duration between 38 and 42 weeks is considered normal (Stuart and Christopher, 2011). The stages or periods of pregnancy are divided into three (3) trimesters. The first trimester is from zero to three month, the second trimester is from four month to the sixth month while the third trimester is from the seventh month to the ninth month in normal pregnancy. Pregnancy is a normal process in the female life cycle. Each trimester involves significant changes both in the mother and the developing foetus (Loh *et al.*, 2007: Stuart and Christopher; 2011). In some individuals, these changes may worsen pre-existing conditions or precipitate new problems. One of such related health problems and or complications in pregnancy is anaemia or inflammatory disease such as pelvic inflammatory disease (Scholl *et al.*, 2007). During this stage of pregnancy there is physiological adjustment in the circulatory system that the amount of haemoglobin may be significantly reduced below what is normal for

an adult woman. This is referred to as physiological anaemia which is due to haemodilution resulting from the disproportionate increase in the plasma volume and red cell mass in pregnancy (Scholl *et al*., 2007: Ross and Horton; 2008; Rovinsky and Jaffin, 2008; Vanden-Broek and Letsky; 2008: WHO; 2011). Haematological parameters are those parameters or test values that are down in the haematology laboratory with the use of specimen in order to assess the component of blood in health and disease as a result of physiological conditions. Examples of haematological parameters are; Packed cell volume (PCV), Erythrocyte sedimentation rate (ESR), Red cell fragility Recticulocyte count (Recti), platelets count, Haemoglobin estimation (HB), Total white blood cell count (Total WBC), Differential white cell count, coagulation test, clotting time etc (Dacie and Lewis; 2005: Ochei and Kolhatkar, 2008; Cheesbrough; 2006; Obeagu, 2018; Obeagu *et al.,* 2016; Obeagu and Obeagu, 2018).   Packed cell volume (PCV) also known as Haematocrit (HCT) or Erythrocyte volume fraction (EVF) is the volume percentage of red blood cells in the blood. The normal range of PCV is about 40-52% for men and 35-47% for women. It is considered as an integral part of a person's complete blood count results, along with haemoglobin concentration, white blood cell count and platelet count (Dacie and Lewis; 2005: Ochei and Kolhatkar; 2008: Cheesbrough; 2006: Venden-Broek and Letsky; 2008). PCV can be determined by centrifuging herpanized blood in a capillary tube (also known as microhaematocrit tube) at 10,000Rpm for 5 minutes. This separates the blood into layers. The volume of the blood sample gives the PCV. Because a tube is used, this can be calculated by measuring the lengths of the layers. With modern laboratory equipment, the haematocrit is calculated by an automated analyzer and not directly measured. It is determined by multiplying the red cell count by the mean cell volume (MCV). Haematocrit is slightly more accurate as the pcv includes small amounts of blood plasma trapped between red cells. An estimated haematocrit as a percentage may be derived by trippling the haemoglobin concentration in g/dl and dropping units. (Harrison, 2009; Poole *et al.*, 2011; Dacie and Lewis, 2005: Ochei and Kolhatkar, 2008; Vanden-Broek and Letsky, 2008). There have been cases in which the blood for testing was inadvertently drawn proximal to an intravenous line that was infusing packed red cells or fluids. This cannot be the true level for the patient because the sample would contain a large amount of the infused material rather than what is diluted into circulating whole blood. That is, if packed red cells are

being supplied, the sample will contain a large amount of these cells and the haematocrit will be artificially very high. If saline or other fluids are being supplied, the blood sample would be diluted and the haematocrit will be artificially low. In cases of elevated PCV is a danger sign of an increased risk of dengus shock syndrome (Oke and Ugwu, 2011:; Loh *et al*., 2007). Polycythemia vera, a myeloproliferative disorder in which the bone marrow produces excessive numbers of red cells. Chronic obstructive pulmonary disease (COPD) and other pulmonary conditions associated with hypoxia may elicit an increased production of red blood cells. This increased mediated by the increased levels of erythropoietin by the kidneys in response to hypoxia (Oke and Ugwu, 2011; Jacques *et al.*, 2006). Low PCV can simply cause by hemorrhage and iron deficient erythropoiesis resulting to anaemia. The groups of individuals at risk for developing anemia include;

- Infant without adequate iron intake.
- Children going through a rapid grow spurt, during which the iron available cannot keep up with the demands for growing red cells mass.
- Women in childbearing years with greater need for iron because of blood loss during menstruation.
- Pregnant women in whom the growing foetus creates a high demand for iron.
- Patients with chronic kidney disease, as their kidneys no secrete sufficient levels of the hormone erythropoietin which stimulate red blood cell production by the bone marrow (Oke and Ugwu, 2011; Huisman et al., 2008; Jacques *et al.,* 2006; Loh *et al*., 2007).

White Blood Cells (WBCs) also known as leukocyte are cells of the immune system involved in defending the body against both infectious disease and foreign materials. Five different and diverse types of leukocyte exist, but they are all produced and derived from a multipotent cell in the bone marrow known as a haematopoietic stem cell. They live for about three to four days in the average human body. Leukocytes are found throughout the body, including the blood and lymphatic stem cell.

Conclusion

Pregnancy or cyesis is the fertilization and development of one or more embryo or foetus, in a woman's uterus. After the point of fertilization, the fused product of the female and male gamete is referred to as zygote or fertilized egg. One of such

related health problems and or complications in pregnancy is anaemia or inflammatory disease such as pelvic inflammatory disease. During this stage of pregnancy there is physiological adjustment in the circulatory system that the amount of haemoglobin may be significantly reduced below what is normal for an adult woman. This is referred to as physiological anaemia which is due to haemodilution resulting from the disproportionate increase in the plasma volume and red cell mass in pregnancy.

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