Evaluation of Changes in Haematological Parameters of Pregnant Women Based on Gestational Age at Olorunsogo Road Area of Ido, Ondo State. Nigeria

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ABSTRACT

The study was done to evaluate the haematological parameters of pregnant women based on gestational age at Olorunsogo Road Area of Ido, Ondo state. Nigeria. A total of one hundred and fifty subjects were recruited for the study comprising of 50 pregnant women for each of the 3 trimesters. The data were presented in tables and were presented as mean ± standard deviation and added using statistical packages for social sciences (SPSS, Version 20.0) and level of significance set at as p ≤ 0.05. The results showed changes in the PCV (p=0.011), LYM (p=0.043), and no significant difference in the Hb (p=0.231), RBC (p=0.214), WBC (p=0.792), MCV (p=0.765), MCHC (p=0.523). The study showed changes in PCV and lymphocytes among the pregnant women across the trimesters.

Key words: Haematological parameters, Pregnant women, Gestational age

INTRODUCTION

Pregnancy is a physiological phenomenon but needs careful antenatal care to have healthy fetomaternal outcome. Human Pregnancy is not a disease, it is a physiological condition; pregnancy produces profound physiological changes that become more significant as pregnancy progresses. Physiologic anaemia is the term often used to describe the fall in haemoglobin concentration that occurs during normal pregnancy results from plasma volume increases above normal by the end of gestation although the red cell masses itself increase by some and still leads to a fall in haemoglobin concentration with a feature of normocytic and normochromic type of anaemia. It is very difficult to define a normal reference range for haemoglobin concentration during pregnancy. According to the standard laid down by WHO, anaemia in pregnancy is present when the haemoglobin concentration in the peripheral blood is 100ml or less. Anaemia contributes to intrauterine growth restriction, preterm labour, abortions and it is also a primary cause of low immunity of both the mother and the baby, which makes them prone for several life threatening infections. The haematologic status in pregnant woman can be evaluated by measuring different blood indices such as haemoglobin concentration, Packed Cell Volume (PCV), RBC count, total WBC count and differential count, MCV, MCH, MCHC, ESR and platelet count. 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.

This study is of importance because systems monitored during antenatal care in an attempt to predict and/or improve pregnancy outcome are dependent on the quality and quantities of haematological parameters. Pregnancy is a state characterized by many physiological haematological changes, which may appear to be pathological in the non-pregnant state. It is therefore important to understand pregnancy induced haematological changes for correct clinical evaluation of pregnant women at different gestational ages. It is

important to know variation in haematological profile during the entire course of pregnancy as well as delivery such that adverse incidents leading to maternal mortality can be minimized and necessitate the need to evaluate the haematological parameters of pregnant women at Olorunsogo Road Area of Ido, Ondo state. The study was done to evaluate the haematological parameters of pregnant women based on gestational age at Olorunsogo Road Area of Ido, Ondo state. Nigeria

MATERIALS AND METHODS

Research design

The study is a hospital based cross-sectional study among pregnant women based on gestational ages. The subjects were selected using a well-structured questionnaire.

Study area

This study was carried out at Olorunsogo area of Ido, Ondo State. Ondo is a state.

Target populations

A total of one hundred and fifty subjects were recruited for the study comprising of 50 pregnant women for each of the 3 trimesters.

Blood collection

5 ml of venous blood was collected from each participant into an Ethylene Diamine Tetra-acetic Acid (EDTA) bottle which was then used for the determination of full blood count.

Validation of instruments

The Full Blood Count (FBC) was re-validated with thin film after processed via automation.

Method of the test

Full blood count (FBC): Measurement of haemoglobin,

red blood, cells, white blood cells and platelets count were done by automation using ADVIA® 2120i Haematology system (SIEMENS).

The cell count was cross check by experienced Medical Laboratory Scientist on duty.

Method of data analysis

The data were presented in tables and were presented as mean ± standard deviation and added using statistical packages for social sciences (SPSS, Version 20.0) and level of significance set at as $p \leq 0.05$.

Ethical clearance

Ethical consideration was sought from the Ethical Committee, Federal Medical Center Owo, Ondo state to use their facility for this research.

Before collection of samples, information regarding the study was explained to the subjects. Oral and written consent form to participation in the study was obtained.

The names of the patients from which samples were taken were not in any case disclosed as confidentiality was strictly adhered.

RESULTS

The table shows the significant difference in the PCV ($37.50 \pm 3.44\%$, $33.50 \pm 4.53\%$, $31.44 \pm 3.56\%$, p=0.011), LYM ($46.7 \pm 2.67\%$, $46.7 \pm 2.67\%$, $44 \pm 3.66\%$, p=0.043) and no significant difference in the HGB (12.50 ± 2.78 g/dl, 11.16 ± 3.22 g/dl, 10.48 ± 2.34 g/dl, p=0.231), RBC ($4.01 \pm 1.68 \times 1012$/L, $3.78 \pm 1.78 \times 1012$ /L, $3.98 \pm 1.78 \times 1012$ /L, p=0.214), WBC ($10.14 \pm 3.33 \times 109$ /L, $11.15 \pm 3.34 \times 109$ /L, $12.67 \pm 4.32 \times 109$ /L, p=0.792), MCV (93.51 ± 6.9 fl, 88.85 ± 9.6 fl, 78.07 ± 7.8 fl, p=0.765), MCHC (33.38 ± 4.4 g/dl, 33.31 ± 5.4 g/dl, 33.31 ± 4.8 g/dl, p=0.523).

Table 1: Mean ± standard deviation of hematological profiles of pregnant women based on trimesters.

Parameters	1st Trimester	2nd Trimester	3rd Trimester	F-Value	P -Value
Age (Years)	24.52 ± 4.7	25.45 ± 4.55	28.45 ± 4.66	5.37	0.832
PCV (%)	37.50 ± 3.44	33.50 ± 4.53	31.44 ± 3.56	2.56	0.011
Hemoglobin (G/Dl)	12.50 ± 2.78	11.16 ± 3.22	10.48 ± 2.34	0.67	0.231
RBC ($\times 10^{12}$/L)	4.01 ± 1.68	3.78 ±1.78	3.98 ±1.78	1.35	0.214
WBC($\times 10^{9}$/L)	10.14 ± 3.33	11.15 ± 3.34	12.67 ± 4.32	6.78	0.792
Lymphocyte (%)	46.7 ± 2.67	43 ± 3.78	44 ± 3.66	0.63	0.043
Neutrophil (%)	51.6 ± 3.6	53.70 ± 5.7	54.60 ± 6.8	1.75	0.752
Monocytes (%)	1.0 ± 0.10	2.7 ± 0.2	1.1 ± 0.2	0.67	0.127
Eosinophil (%)	0.7 ± 0.03	0.6 ± 0.01	0.3 ± 0.01	7.89	0.437
MCV (fl)	93.51 ± 6.9	88.85 ± 9.6	78.07 ± 7.8	1.76	0.765

MCHC (g/dl)	33.38 ± 4.4	33.31 ± 5.4	33.31 ± 4.8	0.56	0.223
MCH (pg)	31.45 ± 3.6	29.54 ± 4.6	26.33 ± 3.4	0.35	0.523

DISCUSSION

Many physiological haematological changes occur during pregnancy due to continuous development of fetus. These changes revert to normal after puerperium. But, these changes are required to meet metabolic demands of mother and also ensure adequate oxygen delivery to fetus. Depending upon the degree of change in the haematological profile, the pregnancy outcome may vary. Thus, it becomes important to monitor haematological parameters during pregnancy, thereby improving its outcome. The results showed changes in PCV and lymphocytes when compared among the pregnant women across the trimesters. Pain, nausea, vomiting, and anxiety have been reported to cause leukocytosis in the absence of infection. The changes in PCV could be linked increased plasma volume resulting in variations in PCV. The PCV should be regularly monitored as the pregnancy progresses. Changes in lymphocytes will have some impact in immune status of the women making them immunocompromised. The lymphocytes should be monitored to avoid serious changes that could predispose the pregnant women to infection and desregulation of cytokines.

CONCLUSION

The study showed changes in PCV and lymphocytes among the pregnant women across the trimesters. Packed cell volume and lymphocytes should be monitored to avert anaemia and poor immunological response.

ETHICAL APPROVAL

Institutional Review Board (IRB) approval from Imam Abdulrahman Bin Faisal University was obtained before starting the research project.

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