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Assessment of Haematological Changes in Pregnant Women of Ido, Ondo State, Nigeria

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ABSTRACT

The study was done to determine and compare the haematological parameters of pregnant women with non-pregnant women at Olorunsogo Road Area of Ido, Ondo state. Nigeria. The study is a hospital based cross-sectional study among pregnant women and women who are apparently healthy individuals. A total of two hundred subjects were recruited for the study. One hundred (100) pregnant women and one hundred (100) non-pregnant women were recruited as controls and enrolled in this study. 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 table above shows the significant difference in the PCV (p=0.001), HGB(p=0.000),RBC(p=0.022), LYM(p=0.034), PLT(p=0.002) MCV(p=0.002), MCH(p=0.023), WBC(p=0.003), Neut(p=0.038), Mono(p=0.044) and Eosin(p=0.023) and no significant difference in MCHC (p=0.674). In conclusion we found a significant reduction in packed cell volume, haemoglobin, red blood cell count; lymphocyte and platelet count in pregnant women while mean values of Mean Cell Volume, Mean cell hemoglobin, White blood cell count, neutrophil, monocyte and eosinophil had a significant increase in pregnant subjects compared to the non-pregnant women.

Key words: Haematological changes, Haematological Parameters, Pregnant Women

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INTRODUCTION

Pregnancy has been described as a physiological phenomenon but needs careful antenatal care to have fit fetomaternal result [1]. Human pregnancy is not an illness, it is a physiological situation; pregnancy creates deep physiological differences that happen to be more important as pregnancy developes. The hormonal variation starts from the ovaries, and then later the placenta. The initial hormone to manifests after conception is human chorionic gonadotropin (hCG) then followed by hormones like; estrogen, progesterone, prolactin, renin and human placental lactogen [2]. It is also important stating that sufficient degrees of circulating thyroid hormones are of main significance for normal reproductive role, all these alterations are followed by developing womb with steady mechanical effect [2]. Pregnancy is the period in which one or more child develops inside a woman's womb. In a pregnancy, there can be multiple pregnancies, as in the case of twins or

triplets. Childbirth usually occurs approximately 38 weeks after conception. In case of women who have a menstrual cycle length of 4 weeks, this is approximately 40 weeks from the last normal menstrual [3]. Pregnancy is influenced by a lot of variables, some of which include culture, environment, socioeconomic status, and access to medical care [4].

Low haemoglobin in the blood is widely identified as a haematological abnormality and it is associated with adverse pregnancy outcome [5]. Physiologic anaemia is the term often used to describe the fall in haemoglobin level that occurs during normal pregnancy outcomes from plasma volume amplifies above normal by the end of pregnancy although theerythrocyte masses itself amplify and still leads to a fall in haemoglobin level with a feature of normocytic and normochromic type of anaemia [5]. It is very hard to define a normal reference range for haemoglobin level during pregnancy. Anaemia contributes to intrauterine growth limitation, preterm labour, abortions and it is also a main cause of low immunity of both the mother and the baby, which makes them prone for several life threatening infections [6]. The haematologic status in pregnant woman can be assessed by determining various haematological parameters such as haemoglobin concentration, packed cell volume (PCV), RBC count, total WBC count and differential count, MCV, MCH, MCHC, ESR and platelet count [5].During this stage of pregnancy there is physiological change in the circulatory system that the level of haemoglobin may be greatly downgraded below what is normal for an adult woman. This is regarded to as physiological anaemia which is due to haemodilution leading to the uneven increase in the plasma volume and erythrocyte mass in pregnancy [7].

The study was done to determine and compare the haematological parameters of pregnant women with non-pregnant women 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 and women who are apparently healthy individuals. The subjects were selected using a well-structured questionnaire who were age and sex matched.

Study area

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

Target population

A total of two hundred subjects were recruited for the study. One hundred (100) pregnant women and one hundred (100) non-pregnant women were recruited as controls and enrolled in this study

Blood collection

5ml 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 1 and 2) 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

Table 1: Background Characteristics (n=200).

Demographic profile	Frequency (Percentage)
Gender	
Pregnant women	50(50%)
Non pregnant women	50(50%)
Age group (years)	
17-30	50(50%)
30 and above	50(50%)

Table 2: Mean ± standard deviation of Hematological parameters of pregnant women and control.

Parameters	Pregnant women	Non-pregnant women	t-VALUE	P- VALUE
Age (Years)	29.32 ± 5.7	25.56 ± 3.45	3.245	0.456
PCV (%)	34.50 ± 2.34	43.30 ± 3.23	5.463	0.001*
Haemoglobin (g/dl)	11.50 ± 0.56	14.43 ± 2.32	0.657	0.034*
RBC (× 1012/L)	4.26 ± 1.34	5.78 ± 1.88	-12.543	0.022*
WBC(× 109/L)	13.64 ± 3.33	7.05 ± 2.34	0.064	0.003*
Lymphocyte (%)	32.7 ± 2.32	45 ± 3.56	0.134	0.034*
Neutrophil (%)	61.6 ±4.6	51.70 ± 6.7	0.764	0.038*
Monocytes (%)	3.6 ± 0.10	2.1 ± 1.2	3.565	0.044*
Eosinophil (%)	2.1 ± 0.3	1.2 ± 0.5	-7.546	0.023*
MCV(fl)	80.67 ± 4.8	74.68 ± 5.7	2.253	0.002*
MCHC(g/dl)	33.78 ± 4.4	33.56 ± 3.4	2.343	0.674
MCH(pg/CELL)	26.99 ± 2.6	24.56 ± 4.6	0.944	0.023*
Platelet (× 109/L)	179 ± 12.23	234 ± 21.2	-2.454	0.002*

KEY: MCV= Mean Cell Volume, MCHC= Mean Corpuscular Haemoglobin Concentration, MCH =Mean Cell Haemoglobin, PCV= Packed Cell Volume, S= significant (P ≤ 0.05)

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 above shows the significant difference in the PCV (34.50±2.34%, 43.30 ± 3.23%, p=0.001), HGB(12.97 ± 1.55g/dl, 10.59 ± 1.63g/dl, p=0.000),RBC(4.26 ± 1.34x1012/L, 5.78 ± 1.88 x1012/L, p=0.022), LYM(32.7 ± 2.32%, 45 ± 3.56%, p=0.034), PLT(179 ± 12.23x109/L, 234 ± 21.2x109/L, p=0.002) MCV(80.67 ± 4.8fL, 74.68 ± 5.7fl, p=0.002), MCH(26.99 ± 2.6Pg, 24.56 ± 4.6Pg, p=0.023), WBC(13.64 ± 3.33x109/L, 7.05 ± 2.34x109/L, p=0.003), Neut(61.6±4.6%, 51.70 ± 6.7%, p=0.038), Mono(3.6 ± 0.10%, 2.1 ± 1.2%, p=0.044) and Eosin(2.1± 0.3%, 1.2 ± 0.5%p=0.023) and no significant difference in MCHC (33.78 ± 4.4g/dl, 33.56 ± 3.4g/dl, p=0.674).

DISCUSSION

According to World Health Organization, one woman dies every minute from a pregnancy-related problem. The major reasons of deaths are due to antepartum and postpartum haemorrhage, unsafe abortion, eclampsia, obstructed labour and infection [8]. Many haematological changes occur during pregnancy due to constant maturity of fetus [8].These adjustments return to normal after puerperium [9]. But, these adjustments are required to meet metabolic demands of mother and also guarantee sufficient oxygen supply to fetus [10]. Depending upon the level of adjustment in the haematological parameters, the pregnancy result may differ [11]. Thus, it becomes vital to check haematological parameters during pregnancy, thereby enhancing its outcome.

The findings from this study were reported from a total of 100 pregnant women at Olorunsogo road area of Ido and 100 non pregnant women acting as control subjects with a mean (SD) age of 29.32 ± 5.7years and 25.56 ± 3.45years respectively (ranges from 18 to 39). It was observed that PCV, haemoglobin and red blood cell counts (RBC) had a significant decrease in the pregnant women compared to the control subjects while the mean values of MCV and MCH was seen to be higher in pregnant women than the control subjects, although these values did not go beyond the WHO recommended reference ranges for these parameters in pregnant women. Additionally, there was a progressive decline in the mean values of the PCV, haemoglobin and RBC during the course of the pregnancy. These findings corroborate those of a similar study undertaken in Ibadan, south-western Nigeria, by Akingbola et al. [12] and DeMayer, et al. [13]. The underlying reason of these adjustments in these parameters during pregnancy are haemodilution, that is rise in plasma volume more as compared to elevation in the erythrocytes mass (40% vs. 20% respectively) , hormonal changes and increased iron demand [9,14].

In this study it was observed that White Blood Cell count, neutrophil, monocyte and eosinophil

had a significant increase (P<0.05) in pregnant subjects compared to the non-pregnant women. This report is in line with the findings reported by a study conducted by Obeagu and colleagues in Abia state [15]. The increase is mainly as a result of an elevation in neutrophils and may represent a reaction to stress due to redistribution of the WBCs between the marginal and circulating pools. It has been reported that pain, nausea, vomiting, and anxiety cause leukocytosis in the absence of infection.. A rising WBC count in pregnancy is not a reliable indicator of infection in subclinical chorioamnionitis; rather, clinical methods of detection such as maternal pyrexia, offensive vaginal discharge, and fetal tachycardia are better indicators, especially of preterm labor and membrane rupture [16].

CONCLUSIONS

In conclusion we found a significant reduction in packed cell volume, haemoglobin, red blood cell count; lymphocyte and platelet count in pregnant women while mean values of Mean Cell Volume, Mean cell hemoglobin, White blood cell count, neutrophil, monocyte and eosinophil had a significant increase in pregnant subjects compared to the non-pregnant women. The lower haematocrit and haemoglobin level of pregnant women when compared with the non-pregnant controls implies that there is need for more emphasis on the importance of prenatal vitamins during the antenatal care period. This could be addressed during prenatal counseling sessions. This will avert anaemia in pregnancy, and consequently, avert poor birth outcomes.

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