

Assessment of Hematological Profile of Pregnant Women

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Abstract

Background: To assess hematological profile of pregnant women. **Subjects and Methods:** One hundred fifty- six women in age ranged 20-40 years were selected. Group I were pregnant women and group II were control. Determination of packed cell volume (PCV), total white cell count (WBC), differential counts, erythrocyte sedimentation rate (ESR) was performed. **Results:** The mean WBC (X10⁹/L) was 7.1 in group I and 4.3 in group II, neutrophil was 53.2% in group I and 43.6% in group II, eosinophil was 10.4% in group I and 6.5% in group II, basophil was 1.21% in group I and 1.32% in group II, monocyte 1.42% in group I and 4.51% in group II, lymphocyte was 35.4% in group I and 45.7% in group II, PCV 31.2% in group I and 38.4% in group II and ESR was 28.4 mm/hr in group I and 11.3 mm/hr in group II respectively. The mean parameters recorded at trimester 1, trimester 2 and trimester 3 showed values of WBC (X10⁹/L) as 6.7, 7.4 and 8.1, neutrophil (%) as 54.2, 46.6 and 55.7, eosinophil (%) as 10.4, 9.5 and 10.6, basophil (%) as 1.29, 1.0 and 1.0, monocyte (%) as 1.42, 0.76 and 1.35, lymphocyte (%) as 34.4, 42.7 and 31.8, PCV (%) as 30.2, 32.4 and 31.6 and ESR (mm/hr) as 34.4, 31.3 and 27.6 respectively. The difference was on- significant (P> 0.05). **Conclusion:** There was alteration in hematological value in pregnant women. A careful examination of these indices is of paramount importance at various trimesters of pregnancy on order to avoid complications.

Keywords: pregnant women, hematological value, Basophils, Eosinophil.

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Introduction

The hematological profile during pregnancy has an impact on pregnant ladies and the outcome of the pregnancy. The most common hematological indices are the indicators of hemoglobin concentration.^[1] The occurrence of anemia ie. low hemoglobin concentration in the blood is characterized as a hematologic abnormality.^[2] An anemic women tend to have severe pregnancy outcome. Anemia during pregnancy is the concentration of hemoglobin < 11.0 g/dL or <the 5th percentile of the distribution.^[3] The chances of miscarriages and low birth weight babies increases two- fold with low hemoglobin level in mother. It is also regarded as reason for lowered immunity of baby and mother which increases chances of infection among both.^[4]

In pregnancy, red blood cell mass increases by 15–20% due to increase in erythropoietin production. The hemoglobin concentration falls by 1–2 g/dl owing to relatively less increase in mass of red blood cells as compared to plasma volume.^[5,6] White blood cell (WBC) count raises significantly in pregnancy due to pregnancy induced physiological stress. Neutrophils donate most to the overall higher WBC count. On the other hand, the platelet count falls drastically owing to hemodilution, increased platelet activation and consumption, especially in the third trimester of pregnancy.^[7,8]

Thrombocytopenia is another common hematologic abnormality after anemia during pregnancy affecting

approximately 8–10% of pregnant ladies.^[9] Preeclampsia, hemolysis, enhanced liver enzymes, idiopathic thrombocytopenic purpura (ITP) and HELLP syndrome are quite common in pregnancy secondary to thrombocytopenia. There is great risk of maternal, neonatal and fetal mortality.^[10,11,12] Considering this, we performed present prospective study to assess hematological profile of pregnant women.

Subjects and Methods

A sum total of one hundred fifty- six women in age ranged 20-40 years were selected for this prospective, observational study. All enrolled ladies were pregnant with different trimesters. They agreed to participate with their written consent. Institutional ethical clearance certificate was obtained before starting the study.

Demographic data of each enrolled patient was recorded. Grouping was done, group I were pregnant women and group II were control. A careful history taking was done followed by physical and gynecological examination. 3 millilitres of venous blood collected from the median cubital vein in K+ EDTA bottle. The blood was properly mixed and determination of packed cell volume (PCV), total white cell count (WBC), differential counts, erythrocyte sedimentation rate (ESR) was measured. Results of the study was compiled and studied for statistical analysis performed using MS excel sheet and SPSS version

19.0. P value was considered significant at 0.05.

Results

Table I Distribution of subjects

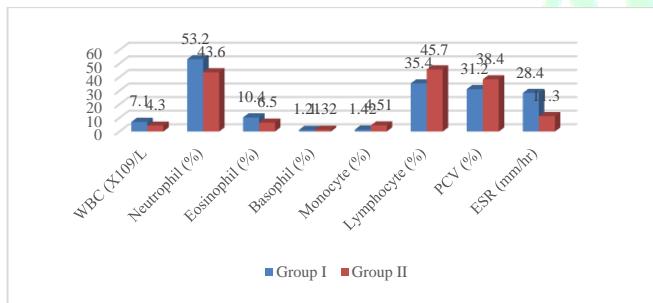
Groups	Group I	Group II
Status	Pregnant	Control
Mean age (years)	34.2	32.8

Group I were pregnant ladies and group II were control. The mean age was 34.2 years in group I and 32.8 years in group II (Table I).

Table II Hematological indices in both groups

Parameters	Group I	Group II	P value
WBC (X10 ⁹ /L)	7.1	4.3	<0.05
Neutrophil (%)	53.2	43.6	>0.05
Eosinophil (%)	10.4	6.5	<0.05
Basophil (%)	1.21	1.32	>0.05
Monocyte (%)	1.42	4.51	<0.05
Lymphocyte (%)	35.4	45.7	<0.05
PCV (%)	31.2	38.4	>0.05
ESR (mm/hr)	28.4	11.3	<0.05

The mean WBC (X10⁹/L) was 7.1 in group I and 4.3 in group II, neutrophil was 53.2% in group I and 43.6% in group II, eosinophil was 10.4% in group I and 6.5% in group II, basophil was 1.21% in group I and 1.32% in group II, monocyte 1.42% in group I and 4.51% in group II, lymphocyte was 35.4% in group I and 45.7% in group II, PCV 31.2% in group I and 38.4% in group II and ESR was 28.4 mm/hr in group I and 11.3 mm/hr in group II respectively. A significant difference was observed (P< 0.05).



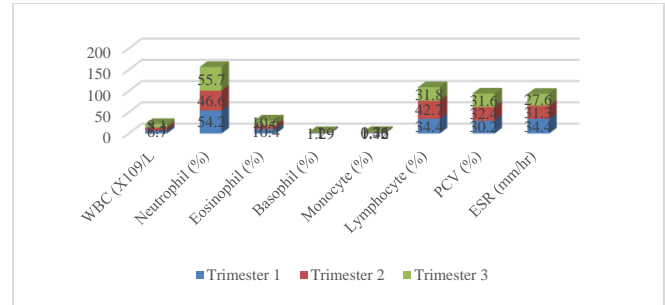
Graph I

Table III Hematological indices in different trimesters

Parameters	Trimester 1	Trimester 2	Trimester 3	P value
WBC (X10 ⁹ /L)	6.7	7.4	8.1	>0.05
Neutrophil (%)	54.2	46.6	55.7	>0.05
Eosinophil (%)	10.4	9.5	10.6	>0.05
Basophil (%)	1.29	1.0	1.0	>0.05
Monocyte (%)	1.42	0.76	1.35	>0.05
Lymphocyte (%)	34.4	42.7	31.8	>0.05
PCV (%)	30.2	32.4	31.6	>0.05
ESR (mm/hr)	34.4	31.3	27.6	>0.05

The mean parameters recorded at trimester 1, trimester 2 and trimester 3 showed values of WBC (X10⁹/L) as 6.7,

7.4 and 8.1, neutrophil (%) as 54.2, 46.6 and 55.7, eosinophil (%) as 10.4, 9.5 and 10.6, basophil (%) as 1.29, 1.0 and 1.0, monocyte (%) as 1.42, 0.76 and 1.35, lymphocyte (%) as 34.4, 42.7 and 31.8, PCV (%) as 30.2, 32.4 and 31.6 and ESR (mm/hr) as 34.4, 31.3 and 27.6 respectively. The difference was on- significant (P> 0.05).



Graph II

Discussion

Hematological changes during pregnancy is a common phenomenon which occurs due to increased demands of the developing fetus and placenta.^[13,14,15] There is 40-45% increase in plasma volume which is facilitated by a direct action of progesterone and estrogen on the kidney resulting in liberation of renin and hence an activation of the aldosterone renin-angio-tensin mechanism.^[16,17] This in turns causes retention of sodium, thereby increasing total body water. Late second trimester encounters more increase at faster rate.^[18,19] We performed present prospective study to assess hematological profile of pregnant women.

Our results showed that the mean WBC (X10⁹/L) was 7.1 in group I and 4.3 in group II, neutrophil was 53.2% in group I and 43.6% in group II, eosinophil was 10.4% in group I and 6.5% in group II, basophil was 1.21% in group I and 1.32% in group II, monocyte 1.42% in group I and 4.51% in group II, lymphocyte was 35.4% in group I and 45.7% in group II, PCV 31.2% in group I and 38.4% in group II and ESR was 28.4 mm/hr in group I and 11.3 mm/hr in group II respectively. A study conducted by Gebreweld et al^[20] found differences in mean hematological parameters between trimesters in values of WBC, HCT, neutrophil and lymphocyte which were statistically significant (p < 0.05). There was 11.6% prevalence of anemia and 7.7% of thrombocytopenia. There was microcytic hypochromic anemia encountered in 51.5%, normocytic hypochromic in 27.3%, normocytic normochromic in 18.2% and dimorphic in 3%.

Our results demonstrated that the mean parameters recorded at trimester 1, trimester 2 and trimester 3 showed values of WBC (X10⁹/L) as 6.7, 7.4 and 8.1, neutrophil (%) as 54.2, 46.6 and 55.7, eosinophil (%) as 10.4, 9.5 and 10.6, basophil (%) as 1.29, 1.0 and 1.0, monocyte (%) as 1.42, 0.76 and 1.35, lymphocyte (%) as 34.4, 42.7 and 31.8, PCV (%) as 30.2, 32.4 and 31.6 and ESR (mm/hr) as 34.4, 31.3 and 27.6 respectively. Osonuga et al^[21] determined hematological parameters in 33 pregnant women and 11

non-pregnant women. The pregnant females showed statistically significant lower values of PCV, monocyte and lymphocyte while WBC, eosinophil and ESR were not significantly altered. There was no significant difference in all hematological parameters among the three trimesters.

Akinbami et al^[22] conducted a study on 274 pregnant women and found that mean hematocrit level was 30.1%; hemoglobin concentration 10.94 g/dL; white blood cells, 7.81×10^9 ; platelets 228.2×10^9 ; packed cell volume 78.3 fL, corpuscular hemoglobin, 28.5 pg; and corpuscular hemoglobin concentration, 36.4 g/dL. The mean hemoglobin concentration values were 11.59 g/dL in first trimester, 10.8 g/dL in second trimester, and 10.3 g/dL in third trimester. A mean white blood cell concentration for first, second, and third trimesters were 7.3×10^9 , 7.88×10^9 , and $8.37 \pm 2.15 \times 10^9$, respectively.

Conclusion

There was alteration in hematological value in pregnant women. A careful examination of these indices is of paramount importance at various trimesters of pregnancy in order to avoid complications.

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