

Study of Hematological Parameters in Pregnancy

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Abstract:

Objective: To determine the effect of pregnancy on haematological parameters and compare the haematological parameters at different stages of pregnancy. **Methods:** The study involved 30 healthy pregnant women as the study group and 10 non-pregnant women as control. The age range of these women was 19-37 years. 2.5 ml of venous blood was collected from each pregnant and non-pregnant women and put into EDTA vial. Complete blood count was estimated using automated haematological analyzer. **Results:** The result showed that study group exhibited statistically significant lower values of haemoglobin, PCV, monocyte and lymphocyte while WBC, eosinophil and ESR were significantly elevated. There was no significant difference in all haematological parameters among the three trimesters. **Conclusion:** Normal healthy pregnancy may have effect on haematological parameters. So it is essential to monitor these parameters during pregnancy. We also find that trimester of pregnancy have no effect on haematological indices.

Keywords: Haematological parameters, Pregnant women, Trimesters, Venous blood.

I. Introduction

The haematological profile of pregnant woman has an impact on pregnancy and its outcome [1 - 3]. The most common haematological indices are the indicators of haemoglobin concentration. Low haemoglobin in the blood is widely identified as a haematological abnormality and it is associated with adverse pregnancy outcome [4]. 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 [5]. It is very difficult to define a normal reference range for haemoglobin concentration during pregnancy. According to the standard laid down by WHO, anemia in pregnancy is present when the haemoglobin concentration in the peripheral blood is 11 gm / 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 [6]. The hematologic 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 each of three trimesters of pregnancy. The aim of our present study was to determine the effect of pregnancy on haematological parameters and compare the haematological parameters at different stages of pregnancy.

II. Materials & Methods

The study was conducted in the Department of Obstetrics and Gynaecology, Bankura Samilani Medical College, Bankura. In this study 30 pregnant women (10 in each trimester) between the ages of 19-37 years were selected from antenatal clinic. 10 non-pregnant age matched women used as control. 2.5 ml of venous blood was collected from each pregnant and non-pregnant women under aseptic condition and put into EDTA vial. Complete blood count was estimated using automated haematological analyzer. All obtained data analyzed using SPSS Ver. 15 software using student paired 't'-test and ANOVA. Differences were considered to statistically significant at 'P' value < 0.05.

III. Discussion

The aim of our present study was to compare haematological indices of pregnant and non-pregnant women and also to evaluate the haematological parameters of pregnant women at different trimesters. In our present study it was found that there was a statistical difference in the haemoglobin concentration and PCV of pregnant women compared with the control (p < 0.05). This correlates with findings of other studies [4,6,7]. The decrease in haemoglobin concentration and PCV may be due to increase in plasma volume during

pregnancy causing haemodilution, hormonal changes that increases fluid retention and iron deficiency [4,8,9]. In our study there was no statistically significant difference in the value of haemoglobin concentration and PCV throughout the whole process of pregnancy. In our study the leucocyte count was significantly higher compared to that of control and remained elevated throughout pregnancy. This is consistent with the findings of other study [10]. This may be a result of the body building the immunity of the fetus and it is achieved by a state of selective immunotolerance, immunosuppression and immunomodulation in the presence of strong antimicrobial immunity. In our study the value of neutrophil is higher in the studied group than the control group, but there is no statistical difference between the value of neutrophil in both the study and control groups. In this present study lymphocyte and monocyte counts were lower while eosinophil count was significantly higher in studied group than in control. This is consistent with the observation of previous studies [10,11]. But Lurrir et. al reported no significant increase in eosinophil count[12]. In this study the value of ESR was significantly increased compared with control group. This is supported by observation of other studies [8, 13]. This may be a result of anaemic state of studied group due to plasma volume expansion and decrease in PCV in normal pregnancy; it may also be due to increased level of fibrinogen in pregnancy [14].

In our study there was no significant difference in the value of all haematological parameters analyzed when compared at different trimesters of pregnancy. This not consistent with the study of James et.al [4] which reported that there was significant difference across the all trimesters in the value of WBC count and packed cell volume.

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IV. Results

Table – 1: Comparison of Hematological indices in pregnant women and control (Mean ± SD)

Parameters	Pregnant Women	Control
Age (Years)	28 ± 9	25 ± 5
Hb (gm/dl)	9 ± 1.5*	12.0 ± 0.6
P.C.V (%)	30.68 ± 4.26*	37.73 ± 3.69
WBC (x 10 ⁹ /L)	7.26 ± 3.02*	4.91 ± 0.88
Neutrophil (%)	51.89 ± 13.88	43.61 ± 0.87
Eosinophil (%)	10.32 ± 4.28*	6.30 ± 3.39
Monocyte (%)	1.40 ± 0.82*	4.15 ± 1.92
Basophil (%)	1.00 ± 0.00	1.28 ± 0.50
Lymphocyte (%)	34.68 ± 14.52*	43.84 ± 12.52
ESR (mm/hr)	32.40 ± 8.68*	10.05 ± 4.28

* p ≤ 0.05 comparing with the control group.

Table – 1 showed the comparison of mean haematological parameters between pregnant and non-pregnant women where difference in haemoglobin concentration, PCV, WBC, Eosinophil, Monocyte, Lymphocyte and ESR were found to be statistically significant (p<0.05).

Table – 2: Hematological values over the three trimesters in pregnant women (Mean ± SD)

Parameters	1 st Trimester	2 nd Trimester	3 rd Trimester	'p' value		
				1 st & 2 nd	1 st & 3 rd	2 nd & 3 rd
Age (Years)	22.18 ± 6.70	24.43 ± 5.40	26.18 ± 5.42	NS	NS	NS
Hb gm/(dl)	9.6 ± 1.1	9.1 ± 1.2	9 ± 1.4	NS	NS	NS
PCV (%)	30.68 ± 2.58	32.40 ± 4.36	31.58 ± 5.48	NS	NS	NS
WBC (x10 ⁹ /L)	6.14 ± 1.76	7.46 ± 2.70	8.09 ± 4.12	NS	NS	NS
Neutrophil(%)	54.15 ± 9.21	47.95 ± 17.92	55.31 ± 11.97	NS	NS	NS
Eosinophil(%)	10.51 ± 5.18	9.71 ± 3.08	10.87 ± 4.88	NS	NS	NS
Monocyte (%)	1.80 ± 0.65	0.84 ± 0.42	1.36 ± 0.74	NS	NS	NS
Basophil (%)	1.00 ± 0.00	-	-	-	-	-
Lymphocyte (%)	33.07 ± 6.41	40.52 ± 19.32	32.68 ± 12.51	NS	NS	NS
ESR (mm/hr)	34.84±22.96	31.48 ± 15.12	26.35 ± 19.40	NS	NS	NS

NS – Statistically Not Significant

Table – 2 showed the mean haematological parameters between the three trimesters of pregnancy. All the values were compared with each other between trimesters and none of the parameters were found to be statistically significant.