



Evaluation of Hematological Changes in The Pregnant Women in EL-Beyda City- Libya

Najat M. H. Mohammed^{1*}, Kasem A. Farag²

¹Faculty of Medical Technology, Laboratory Medicine Department, Omer AL-Mukhtar University, EL-Beyda-Libya

²Faculty of Science, Mathematics Department, Omer AL-Mukhtar University, EL-Beyda-Libya.

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ABSTRACT

Corresponding Author
Najat.mohammed@omu.edu.ly

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Background: Pregnant women normally undergo to several hematological changes perhaps anemia is considered the significant one. It is a major public health problem and commonly associated with many consequences as low birth weight, premature delivery and the increased risk of the maternal mortality and morbidity in the pregnant women, mainly in the developing countries

The aim of the study: The present study was designed to estimate the changes in hematological parameters in women during pregnancy at EL-Beyda City. Methods: Cross sectional study involved 350 randomly selected pregnant mothers who are attended several medical clinics in the period of February to July 2022, of age group 17-48 years. A venous blood samples were collected in EDTA tubes and analyzed for complete blood counts (CBC) to evaluate hemoglobin levels (Hb), mean cell volume (MCV), mean cell hemoglobin (MCH), mean cell hemoglobin concentration (MCHC), white blood cells (WBCs) and platelets count. Other data were also reported including women age, trimester of pregnancy, the number of the gravida and the parity. Results were obtained by analyzing collected data by SPSS version 26 and represented as mean \pm SE and P value is considered significant when it is less than 0.05.

The Results: The mean age of the participants women was 29.5(\pm 0.33), the overall prevalence of anemia was 57% and vast of them were in third trimester period. Out of 204 anemic women, 109 (53.4%) of them had normocytic normochromic anemia (mean of MCV 88fl). while the rest 94 (46%) were suffered microcytic hypochromic anemia (mean of MCV 72fl). The present investigation was revealed that the mean of hemoglobin of anemic women was 9.84 \pm 0.06, which are significantly different in the mean of non-anemic women (p value =0.000) as well as majority of women 165 (81 %) had mild anemia (Hb= 9-10.9 g/dl).

Conclusion: We can conclude that the prevalence of anemia in Libya in the studied population is considerably high in comparison to other countries, therefore the great awareness efforts are recommended to encourage a regular antenatal checkups

1.0 Introduction

Pregnant women normally undergo to profound hematological changes perhaps anemia is considered the main hematological problem. It is contributing to the maternal, neonatal mortality and morbidity around the world (Kadhim J S, et al, 2020; Okube OT, et al, 2016) affecting 35-75% of pregnant women in Africa (Hussain AM, et al 2016; Anjum A, et al 2015). According to WHO, anemia in pregnant women is diagnosed when hemoglobin concentration (less than 11g/dl) or hematocrit value (HCT) are less than 33% (Dessalegn FN, et al, 2021). The reduction in hemoglobin (Hb) contents inside the red blood cells will diminish oxygen-carrying capacity to the maternal body tissues (Lebso M, et al, 2017). Hematological parameters are usually changed

physiologically during pregnancy which are related to the increase of the body demand to the nutritional factors such as folic acid, vitamin B12 and iron as fetus requirements increase as well (Al-Wousabi, F, et al, 2012; Berhe B, et al, 2019). One of these changes is the increase of total blood volume by 1.5 Liters to nourish the new fetus vascular bed demand (Lebso M, et al, 2017; Young MF, et al, 2019, Chandra S, et al, 2012). In addition there is a drop in hemoglobin content about 1-2 g/dl by late of the second trimester and then stabilize in the third trimester (Chandra S, et al, 2012;WHO, 2011). The recent investigations have reported that almost 600,000 women between the ages of 15 and 44 years worldwide are known to die each years as a result of pregnancy's and childbirth complications (Hoque M,

et al, 2007). The proportion of maternal deaths due to anemia as estimated in some countries such as India (16%), Kenya (11%), Nigeria (9%) and Malawi (8%) (Hoque M, et al, 2007). In comparison with Arabic countries the prevalence was higher about third of pregnant women were suffered from anemia, 30% in Egypt, Saudi Arabia 40% and Iraq 31% (Elzahaf RA, et al, 2020; Imran MS, et al, 2019) also the pregnant women usually suffer from leukocytosis contributed to physiological stress (Chandra S, et al, 2012; Fleming AF 1975). The Previous studies have also showed that the platelet count normally decrease during pregnancy, particularly in the third trimester, this is termed as “gestational thrombocytopenia”. Fleming, AF, 1975) [Azab AE, et al, 2020). The most widespread nutritional anemia in the pregnant women are iron deficiency anemia affecting about 80% of women population followed by folate deficiency (megaloblastic anemia) with 76% as a result of inadequate diets or are not receiving prenatal iron and folate supplements (Imran MS, et al, 2019; Dessalegn FN, et al, 2021; Ahamed NH, et al, 2018). The present study aimed to estimate the hematological changes occurred during pregnancy in women at EL-Beyda City.

2. Materials and Methods

This descriptive cross sectional study was included 350 randomly selected pregnant women who are seeking for antenatal care at different centers in EL-Beyda city during the period from February to July 2022. Women aged less than 18 years were excluded. A venous blood samples were collected in EDTA tubes and analyzed for complete blood counts (CBC) to evaluate hemoglobin level (Hb) , white blood cells (WBCs), mean cell volume (MCV Mean cell hemoglobin (MCH), mean cell hemoglobin concentration (MCHC) and platelets count. Anemia is defined by using the WHO criteria of hemoglobin values of less than 11g/dL and classified as follow (Al-Wousabi F,et al, 2012; Eweis M, et al 2020). Mild anemia 9.0-10.9 g/dL , Moderate anemia 7.0-9 g/dL Severe anemia <7.0 g/dL. MCV is used to evaluate cell volume and considered microcytic if is less than 79fl and macrocytic if more than 100fl as well as hypochromia is depended on MCH value (less than 32pg). Leukocytosis is documented if count of white blood cells more than 5x10³/L, and thrombocytopenia if platelet counts is less than 20x10⁹/L. The data were collected by interviewing with pregnant women including age, trimester of pregnancy, the gravida and the parity. Results were analyzed by SPSS version 26 and represented as mean ± SE and P value will be significant if it less than 0.05.

3. Results

The present study involved a total of 350 pregnant women who are attended the several medical clinics in EL-Beyda City. The overall prevalence rate of anemia was 57%, the mean hemoglobin of anemic women was 9,84±0.06 in comparison to hemoglobin of the normal women (12.31±0.07) (Table 1). The mean age of the participants women was 29.5(±0.33). The age group of the pregnant

women ranged from 17 to 48 years and the majority of anemia where found in two the age group between 17-25 and 26-34 (table 2). Out of 204 anemic women, 94 of them were suffered from microcytic hypochromic anemia (Mean MCV 72fl), while almost the reminder cases appeared with normocytic normochromic anemia (Mean MCV 88fl) table 3. Concerning to the obstetric history, table 4 shows that there is relationship between gestational age and anemia since anemia is more prevalent in third trimester than in the first and second trimester (0.02). While regarding to the parity and gravida, the result showed that there is no correlation between number of the parity and anemia (p=0.42) as found in table 5. In general, there was 136 (38.8 %) of total 350 pregnant women had elevated leukocytes count (mean 14.29±0.34), also 39 (11%) of total cases had thrombocytopenia (Fig. 1).

Table 1. Hematological parameters of anemic and non-anemic pregnant women in the term of Mean±SE.

Parameters	Mean ± S.E		p-value
	Anemic	Non – Anemic	P< 0.05
Hb (g/dl)	9.84±0.06	12.31±0.07	0.00
HCT (%)	31.36±0.21	39.04±0.09	0.00
MCV(fl)	72.1±0.56	88.86±0.35	0.00
MCH (Pg)	23.58±0.16	29.34± 0.26	0.00
MCHC g/dl	30.19±0.25	33.80±0.16	0.00

Table 2. Prevalence of anemia according to the age group

Age	Frequency	Percentage %
17 – 25	54	27.3
26 – 34	107	54
35 – 43	36	18.2
Above 45	1	0.5

Table 3. Types of anemia according to the severity and mean cell volume (MCV), presented as percentage

Anemia	Frequency	Percentage %
Mild	165	81
Moderate	37	18
Severe	2	1
Total	204	
Microcytic anemia	94	46%
Normocytic anemia	109	53.4%
Macrocytic anemia	1	0.5%
Total	204	

Table 4 . The prevalence of anemia with respect to gestational period of the study population

Trimester	Anemic cases (no.)	Non anemic cases (no.)	Prevalen ce of anemia %	Pearson chi square (p)
First	31	15	15.2%	0.02
Second	43	13	21.1%	
Third	130	118	63.7%	
Total	204	146	100%	

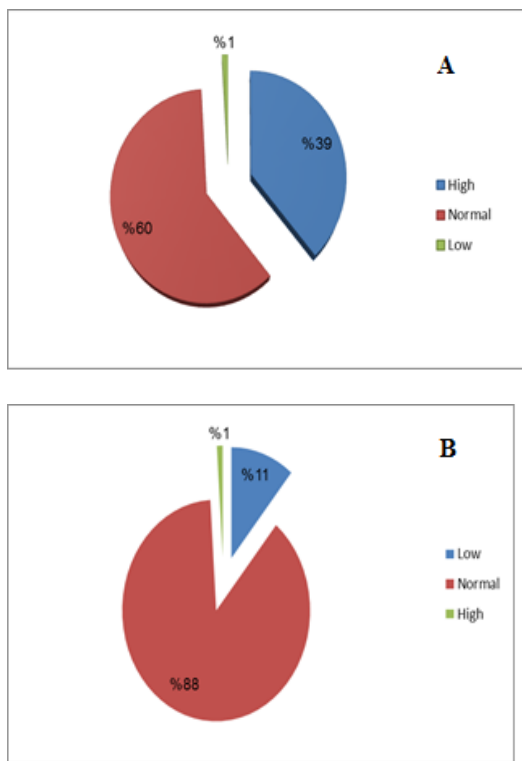


Figure 1. Percentage of white blood cells (A) and platelets count(B) of study population

4.0 Discussion

The current study demonstrated a group of changes in the hematological parameters, involved dropping of hemoglobin below normal levels, presence of iron deficiency anemia as well as leukocytosis and thrombocytopenia in some of volunteers. The overall prevalence of anemia was 57% with mean hemoglobin concentration 9.84 ± 0.06 g/dl. This prevalence is considerably higher than the estimated rate in 2011 according to WHO which found that 28% of Libyan women were anemic (Abedi GA, et al, 2020; Elzahaf, RA et al., 2016). Our prevalence is similar to other findings conducted in Nigeria and Kenya with 54.5%, 57% respectively (Goodarzi, E, et al, 20202). However the estimated prevalence observed in other countries was relatively low as seen in Algeria 40.08 %, in Bahrain 26.2%, and in Macca city 39% (Okube, OT, et al, 2016). These variations in the prevalence may be due to different methodology and sampling techniques used, nutritional habits and characteristics of the target population. In addition, the mean of hemoglobin of anemic women was 9.84 ± 0.06 g/dl which differ significantly to the mean of non-anemic mothers(=0.00) this the drop of hemoglobin content could have a serious negative consequences on women health since the most other studies showed that anemia leads to intrauterine growth retardation, preterm delivery and low birth weight (Abedi GA, et al, 2020; Berhe B, et al, 2012).The predominant anemia in this study was in the mild stage

according to WHO classification (Hb 9.9-10.9g/dl) which is different from another finding in Iraq in 2020 that found that the most of participants were in the moderate stage and some in the severe level. The majority of cases had normocytic normochromic anemia (53.4%), which may refer to the presence of other causes such as urinary tract infection or blood loss (Imran, MS, et al , 2019). While 46% of cases had microcytic hypochromic anemia and this may due to iron deficiency and depletion of body iron stores which further related to the frequency of the pregnancies (Okube OT, et al, 2016; Fuzi, SFA, e al, 2017). This in agreement with the previous findings showed that about of 45-89% of pregnant women around the world were iron deficient. A recent study in 2021 was carried in Ethiopia reported that the incidence of iron deficiency anemia was 19.3% (Dessalegn, FN, e al, 2021). Some literatures have documented that consuming of black tea immediately after meals will reduce iron absorption due to its inhibitory effect on iron bioavailability (Woled, T, 2014). the presence of phenols in tea and coffee are considered as the potent inhibitors of iron absorption (Soliman, GZA, et al, 2007). beside to the unhealthy habits of low intake of red meat, iron rich foods and vegetables was also associated with anemia (Kadhim J S, et al, 2020; Taner üE, et al, 2015). Thus the manner of the diet during pregnancy should be investigated since the most of Libyan population drink tea immediately after meals, and it is supposed to introduce other important biochemical tests including measurement of serum iron, ferritin should to classify the types of anemia. Our finding showed that most of anemic cases where in third trimester period indicating the increased demand for fetal growth and accelerated of red cell production which in agreement with some publications who said that the prevalence of anemia is higher in third and second trimester than in the first trimester (Okube OT , et al, 2016). Similarly, another study was conducted in Ethiopia found that prevalence were common in second and third trimester (Young, MF, et al, 2019, Al-Aini, S, et al, 2020). Our study showed that there was no association between anemia and number of pregnancies ($p=0.42$), which is contrary to other reports who observed that pregnant women with multiple parity are more likely to have anemia than those with one parity, which is contributed to the reduced of maternal iron reserves in prior pregnancies and lactations periods (Hoque , et al, 2007). One of the interesting findings is that of total 350 pregnant women, 136 (39%) of them appeared with leukocytosis mainly neutrophilia, some reporters explained this elevation as physiological condition related to impaired neutrophil apoptosis as a result of pregnancy stress (Hoque , et al, 2007; Elzahaf RA, 2016 ; Babker AM, Elnaim EOD, (2020). Moreover, others reported that monocytes counts usually elevated during pregnancy especially in the first trimester due to its role in preventing fetal allograft rejection by infiltrating the decidual tissue (7th 20th week of gestation) Hoque , et al, 2007). Regarding changes in platelets count, our study revealed no significant difference and only 11% were suffered from thrombocytopenia while almost had normal range, this finding nearly similar to the results noticed by Azab E et al who found that there was a minimal fall in platelets count but with no significant adverse out comes. Others mentioned that the mains cause of lowering platelet count is related to platelets

destruction through damaged placental trophoblasts however, there is no clear mechanism.(Fay R,(1983). Early visit to antenatal care center during first trimester of pregnancies could strongly effective to prevent anemia intervention through regularly iron supplementations (Chandra S, et al, 2012).

5. Conclusion

We can conclude that pregnancy can alter blood indices causing fall in hemoglobin, hematocrite as well as MCV values which absolutely is attributed to negative maternal outcomes therefore, great efforts should be put in order to manage the anemia during pregnancy starting from government policy to promote health education and provide supplement for mothers in antenatal care for free.

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