

## Lab Diagnosed Anemia among Women in Alyamamah Hospital in Riyadh, Saudi Arabia

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### ABSTRACT

**Background:** anemia in pregnancy is a common problem. Easy diagnosis and treatment enhance focus on anemia cases.

**Aim and Objectives:** to determine the common types and grades of anemia in a hospital lab in Riyadh and to compare types of anemia among age and pregnancy status.

**Method:** cross-sectional study. Study area: a hematology-log in lab. Samples: convenience samples of 120 anemic ladies. Tool: questionnaires. Methods of data collection: CBC results.

**Results:** This study-addressing anemia among women in a lab in Riyadh involves 120 ladies. When they were distributed as pregnant and non-pregnant women, 70% were pregnant. About 70% of the pregnant and 39% of non-pregnant had iron deficiency anemia, this difference statistically significance ( $P= 0.0013$ ). Normocytic normochromic anemia was falling in 26% and 50% of the pregnant and non-pregnant ladies respectively; this difference was statistically significant ( $P= 0.0112$ ). About 94.5% of iron deficiency anemias have low MCH. PCV was low in all cases of anemia.

**Conclusion:** Anemia in women of child bearing age are more commonly observed in study. Most common type of anemia among cases was iron deficiency anemia. Iron deficiency anemia was the most common in pregnant, while normochromic normocytic anemia was the most common in non-pregnant. MCV & MCH were significant characteristics finding in iron deficiency anemia.

**Keywords:** Anemia, Iron, Women, Pregnant, Non-pregnant.

### ABBREVIATIONS

CBC: Complete Blood Count; MCH: Mean Corpuscular Hemoglobin; PCV: Packed Cell Volume; MCV: Mean Corpuscular Volume; SCA: Sickle Cell Anemia; MCHC: Mean Corpuscular Hemoglobin Concentration; IDA: Iron Deficiency Anemia.

### INTRODUCTION

Anemia is a reduction in the total circulating red blood cells (RBCs) mass below normal limits; the consequences are reduced oxygen carrying capacity and tissue hypoxia. Patients are pale, weak, and easily fatigued. Anemia is formally diagnosed based on a reduction in hematocrit and/or hemoglobin concentration. The classification of anemias is usually based on the underlying mechanism; the specific of RBC morphology (size, shape, and hemoglobinization) can often provide etiologic clues. Those,

microcytic, hypochromic anemias suggest

disorders of hemoglobin synthesis (most often iron deficiency), while macrocytic anemias suggest abnormalities in bone marrow erythroid precursor maturation; normochromic, normocytic anemias have diverse etiologies<sup>(1)</sup>.

Iron deficiency is the most common cause of anemia in every country of the world. It is the most common cause of a microcytic hypochromic anemia, in which all three red cells indices (the MCV, MCH, and MCHC - mean corpuscular volume, hemoglobin and hemoglobin concentration, respectively) are reduced and the blood film shows small (microcytic) and pale (hypochromic) red cells. This appearance is caused by a defect in hemoglobin synthesis<sup>(2)</sup>.

The research aims to determine the common types and grades of anemia in a hospital lab in

Riyadh to compare types of anemia among age groups and pregnancy status.

**MATERIALS AND METHODS**

Data analyzing: after collecting the data and excluding unclear and incomplete lab records, coding and entry was done and analyzed using percentage and the Chi square test of significance.

**RESULTS**

This study-addressing anemia among women in a lab in Riyadh involves 120 ladies. When they were distributed as pregnant and non-pregnant women, 70% were pregnant, and about 20% of the pregnant were 40 years or older compared to about 3% of the non-pregnant. About 64% of pregnant were 30 years or older compared to 31% of non-pregnant. This difference in age reached statistical significance (P= 0.0014) (Table 1).

The proportion of pregnant women with hemoglobin of less than 8 g/dL were 34.5% compared to 38.9% of non-pregnant women. This difference in hemoglobin did not reach statistical significance (Table 2). When types of anemia were classified as iron deficiency, sickle cell, normocytic normochromic, and megaloblastic anemia in relation to pregnancy. Around 61% of the ladies have iron deficiency anemia, about 70% of the pregnant and 39% of non-pregnant had iron deficiency anemia. This difference in the proportion with iron deficiency anemia between the pregnant and the non-pregnant was statistically significance (P= 0.0013), where 80.8% of iron deficiencies were pregnant. In normocytic normochromic the percentage was 33.3% of total ladies, 55% of them were pregnant. Normocytic normochromic anemia was falling in 26% and 50% of the pregnant and non-pregnant ladies respectively. The difference was statistically significant (P= 0.0112) (Table 3). Severe anemia (< 7 g/dL) was encountered in 92% of ladies. About 91% of the severe anemia was confined to age group 20 – 39 years old (Table 4). 58% of the age 20-29 year had iron deficiency anemia. In the group of age 30 – 39 years 75% of normocytic normochromic, these variations were not statistically significant (Table5).

According to MCH value for 120 CBC results of ladies, the value either low or normal. About 94.5% of iron deficiency anemias have low MCH, and 30% of normocytic normochromic anemias have low MCH (Table 7). By the results of MCHC, about 82% of all cases had normal value. In iron deficiency anemia 77% had normal value. In normocytic normochromic 88% had normal value (Table 8). PCV was low in all cases of

anemia (Table 9).

**Table 1:** Age and pregnancy status

Age	Pregnant	Non-pregnant	Total
< 20	4	2	6
20 - 29	26	23	49
30 – 39	37	10	47
40 – 49	17	0	17
≥ 50	0	1	1
Total	84	36	120

**Table 2:** Hemoglobin concentration (g/dl) among pregnant and non-pregnant women

h b g/dl	Pregnant	Non-Pregnant	total
< 6	0	0	0
– 6.9	7	3	10
– 7.9	22	11	33
– 8.9	27	7	34
– 9.9	28	15	43
Total	84	36	20

**Table 3:** types of anemia among anemic adult female (pregnant & non-pregnant)

Type of anemia	Pregnant	on-pregnant	total
Iron deficiency	59 (70%)	14 (39%)	73
Sickle cell	0	2	2
Normocytic Normochromic	22 (28%)	18 (50%)	40
Megaloblastic	3	2	5
Total	84	36	20

**Table 4:** severity of anemia compared to age variation

Age in Years	Mild (10 – 10.9 g/dl)	Moderate (7 – 9.9 g/dl)	Severe (< 7 g/dl)	Total anemia (< 11 g/dl)
< 20	0	6	0	6
20 – 29	0	43	6	49
30 – 39	0	42	4	46
40 – 49	0	17	1	18
≥ 50	0	1	0	1
Total	0	109	11	120

**Table 5:** types of anemia compared to age variations

Age in Years	Iron deficiency	Sickle cell	Normocytic Normochromic	Others	Total
< 20	1	0	5	0	6
20 – 29	28	1	17	2	48
30 – 39	32	1	13	2	48
40 – 45	12	0	4	1	17
> 45	0	0	1	0	1
Total	73	2	40	5	120

**Table 6:** comparing types of anemia with MCV value

Type of anemia	MCV value		
	Normal	Low	High
Iron deficiency	1	72	0
Sickle cell	2	0	0
Normocytic Normochromic	33	7	0
Megaloblastic	0	0	5
Total	36	79	5

**Table 7:** Comparing types of anemia with MCH value

Type of anemia	MCH value		
	Normal	Low	High
Iron deficiency	4	69	0
Sickle cell	1	1	0
Normocytic normochromic	28	12	0
Megaloblastic	2	0	3
Total	35	82	3

**Table 8:** Comparing types of anemia with MCHC value

Type of anemia	MCHC value		
	Normal	Low	High
Iron deficiency	56 (77%)	17	0
Sickle cell	2	0	0
Normocytic Normochromic	35 (88%)	5	0
Megaloblastic	5	0	0
Total	98	22	0

**Table 9:** Comparing types of anemia with PCV value

Type of anemia	PCV value		
	Normal	Low	High
Iron deficiency	0	73	0
Sickle cell	0	2	0
Normocytic Normochromic	0	40	0
Megaloblastic	0	5	0
Total	0	120	0

## DISCUSSION

This study has been done among anemic females and for the most part comparisons were done between pregnant and non-pregnant. The findings that pregnant were older than the non-pregnant was expected. Anemia in older women is more commonly observed in the study. As seen in studies, both adolescent and adult women were shown to have significantly higher rates of IDA

during pregnancy if given placebo compared to 60 mg of elemental iron daily. This would suggest that the growth spurt and onset of menses prior to conception in iron sufficient women does not give adequate iron stores to prevent IDA without oral supplemental iron during pregnancy<sup>(3)</sup>. Both ID and anemia were prevalent in this high-risk maternity population and anemia was shown in 45% of women during the third trimester<sup>(6)</sup>. All older pregnant women should be offered screening for anemia as early as possible. However, The Centers for Disease Control and Prevention and the Federation of the American Societies for Experimental Biology recommend periodic screening for and treatment of anemia for all females of childbearing age to prevent iron deficiency<sup>(4)</sup>.

By dividing patients to pregnant and non-pregnant compared to severity of anemia, most of the patients were found to have moderate anemia, because most common type of anemia among cases was iron deficiency anemia, which characterized in most instances, by being mild and asymptomatic.

When comparing the most common type of anemia with pregnant and non-pregnant ladies, the finding was that iron deficiency anemia was the most common in pregnant, while normochromic normocytic anemia was the most common in non-pregnant. However, several studies reported a high prevalence of anemia during pregnancy in the absence of iron deficiency<sup>(5)</sup>. On other study, the incidence of IDA in our study was higher in adolescent than adult pregnancies<sup>(3)</sup>. This explains physiological increased demand of iron during pregnancy, while in non-pregnant, the heavy irregularity menstrual cycle cause anemia.

When severity of anemia was distributed among age variation, severe anemia was encountered with patients' age group from 20-39 years old. In developing countries, additional higher risks for severe IDA in adolescent pregnancies include the young age at conception before the extra iron needs of maternal growth have been met, anemias associated with infectious diseases such as malaria, and hemoglobinopathies<sup>(3)</sup>. This is explained by the childbearing age where they have more susceptibility to become anemic either by pregnancy or irregularity of menstrual cycle. While other research said, this is the first study to confirm that the risk of iron deficiency anemia is greater in Mexican American than in non-Hispanic, white, adolescent girls and women of childbearing age after adjustment for potential risk factors<sup>(4)</sup>.

By distributing common types of anemia to age variations, the most common type was iron deficiency anemia especially with age group (30 – 39 years old). While most of normocytic normochromic cases were among age (20 – 29 years old).

Through MCV values compared with most common types of anemia, as MCV is significant characteristics in finding in iron deficiency anemia, and iron deficiency anemia the most common type anemia through cases. Expected that most of MCV values were low in most cases.

Through MCH values compared with most common types of anemia, as MCH is significant characteristics finding in iron deficiency anemia, and iron deficiency anemia the most common type anemia through cases. Expected that most of MCH values were low in most cases.

As MCHC is calculated by dividing the hemoglobin by the hematocrit, and most of cases values have low hemoglobin and hematocrit, deviation of MCHC to low values are not common, This can occur in a strongly regenerative anemia, while study cases have most common type of iron deficiency anemia.

As PCV was used to assess level of anemia, and study cases selectively were anemic patients, this explained that all cases have low PCV values.

#### **CONCLUSION**

Anemias in women of childbearing age are more commonly observed in the study. Most of the patients were found to have moderate anemia, because most common type of anemia among cases was iron deficiency anemia, which was characterized in most instances, by mild and asymptomatic. Iron deficiency anemia was the most common in pregnant, while normochromic normocytic anemia was the most common in non-pregnant. Severe anemia was encountered almost exclusively in patient's age group from 20-39 years old. The most common type was iron deficiency anemia especially with age group (20 – 29 years old). While most of normocytic normochromic cases were among age (20 – 39 years old). MCV & MCH were significant characteristics finding in iron deficiency anemia. Most of the cases values have low hemoglobin and hematocrit, deviation of MCHC to low values are not common. All cases have low PCV values.

#### **RECOMMENDATIONS:**

- Regular early check in pregnancy.
- Routine check for all females.

-Supplementation for pregnant and early treatment of all anemic patients.

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#### **ETHICAL APPROVAL**

The study was approved by the ethical committee at Alyamamah Hospital in Riyadh, Saudi Arabia.

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Nil

#### **AUTHORS' CONTRIBUTION**

All authors took part equally in writing, revising and final approval of the manuscript.

#### **CONFLICT OF INTEREST**

The authors have no conflict of interest to declare.

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