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(RESEARCH ARTICLE)



## Anemia among pregnant women in the northwest of Libya

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### Abstract

Anemia is a significant public health problem worldwide, especially in developing countries, leading to mortality and morbidity in women and children. Anemia may cause low birth weight and premature birth, and increase the risk of maternal mortality due to bleeding and other delivery complications. However, iron deficiency is the most cause of anemia. Therefore, our primary objective is to estimate the prevalence of anemia in the northwest part of Libya. A hundred pregnant women participated in this study. Hemoglobin (Hb) level, mean corpuscular volume (MCV), and iron concentration were measured. In addition to that, a questionnaire was completed to collect information such as age, education, medication, and whether the participants drink tea or coffee after a meal. The level of anemia was very high; it was found that 72% of pregnant women. Out of this, 66.6%, 30.5%, and 2.9% were mild, moderate, and severe anemia, respectively.

**Keywords:** Anemia; Hb; MCV; Pregnant

### 1. Introduction

Anemia is defined as a low level of Hb below: 13.0 g/dL in adult men, below 12.0 g/dL in women (1), and below 11.0 g/dL in pregnant women (9,1). However, Hb levels may vary according to age and race. Furthermore, lifestyle also impacts Hb levels (cigarettes, food habits) (2). In addition to that, places of higher altitudes may affect the level of hemoglobin (2). However, hypoxia leads to an increase in red blood cell count (2). Anemia affects 25% of the world's population, and iron deficiency (IDA) is the most cause (1). In addition to IDA, anemia could be due to chronic infections, particularly malaria (3), hereditary hemoglobinopathies, and other vitamin deficiencies, especially folic acid (4). In developing countries, anemia's prevalence is 3 to 4 times greater than in industrial countries (5). People with low hemoglobin, low mean corpuscular volume (MCV), or low mean corpuscular hemoglobin (MCH) could be suffering from anemia due to iron deficiency (6). The prevalence of iron deficiency anemia worldwide is high, affecting the general health and wellbeing of 2 billion people (5), whereas 3.5 billion people in developing countries are estimated to suffer from anemia (5). Furthermore, anemia is considered a significant public health problem that can lead to mortality and morbidity in women and children (7). Anemia may cause low birth weight and premature birth, as well as increase the risk of maternal mortality due to bleeding and other delivery complications (8). Anemia is very prevalent in Africa; 57.1% of pregnant women were found to be anemic, more specifically, 62.7% of pregnant women in Ethiopia (9). The definitive diagnosis of iron deficiency depended on low serum iron and low level of transferrin. However, serum ferritin can also be reduced in liver disease, inflammation, or cancer disease (10). Therefore, to treat and solve anemia's high prevalence, especially in developing countries, and despite many efforts, more attention and studies should be created. So, our study's main objective is to estimate anemia's prevalence in the northwest of Libya.

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### 1.1. Objective

To determine the prevalence of anemia, especially IDA, among pregnant women who attended to Jado hospital in Libya.

### 2. Methods

A hundred randomly selected pregnant women of reproductive age (19-49 years) with a mean age of 35.2 participated in this study. All attended Jado hospital, which is located at a high altitude, about 1000-m above the sea level; it is about 200 km away from the capital city of Libya to the northwest. The study was conducted in 2013 from May 2, Jun 20. However, during their usual medical checkup, 5 ml of venous blood was collected in an EDTA tube for complete blood count (CBC) and a plane tube to separate serum to test iron levels. However, due to limited time in this study and other reasons, we only measured Hb, MCV, and iron results. In addition to that, a questionnaire asked for information from patients about a name, age, residence, chronic diseases, education, a period of pregnancy, and tea or coffee drinking to assess the risk factors. Types of anemia were classified as:

Mild anemia 9.0-10.9g/dl

Severe anemia <7.0 g/dL

Moderate anemia 7.0-8.9g/dL (11,12)

References were used to define the normal ranges for MCV> 76.0–96.0 fl; Hb > 10.9 g/dl.

### 3. Results

**Table 1** Distribution of pregnant women according to the address

Name of the city	Number of cases
Jado	37
Rigban	29
Alrhebat	31
Alzintan	3
Total	100

**Table 2** Prevalence of anemia among pregnant women.

Number of cases	Normal	Anemic
100	28	72

Out of 100 pregnant women, 72 showed a low level of Hb, MCV, and iron concentration. As a result, the level of anemia was very high.

**Table 3** Distribution of anemia according to their age groups.

Age group	Number of cases	Percentage%	Average Hb
19-28	43	43%	10.5
29-38	52	52%	9.1
39-49	5	5%	9.9

Most anemic patients were observed in the age group 29-38 old, as shown in table 3; Hb concentration 9.1, and table 4 MCV was 72.15.

**Table 4** Age groups wise mean of MCV.

Age group	Number of cases	Percentage%	Average MCV
19-28	43	43%	81%
29-38	52	52%	72.1%
39-49	5	5%	90%

**Table 5** Anemia according to gestational age.

Month	Number of cases	Percentage%	Average Hb g/dl
1-3	17	17	10.7
3-6	23	23	10.1
6-9	60	60	9.2

Clearly that the third trimester (6-9mo) showed a lower level of mean hemoglobin concentration when compared with the other months.

**Table 6** Comparison of healthy pregnant women finding and anemic pregnant women.

Healthy subjects			Anemic patients		
Number of normal cases	Test	Average	Cases number		Average
28	Hb	11.9	72	Hb	9.5
28	MCV	84.8	72	MCV	72
28	Iron	77	72	Iron	59.7

Anemia was seen in 72% of pregnant women when compared with non-anemia pregnant women as in table 6 (Hb concentration 9.5g/d vs11.9g/dl).

**Table 7** Classification of Anemia according to the severity.

Number of normal cases	Type of Anemia	Percentage%
48	Mild	66.6
22	Moderate	30.5
2	Sever	2.9
Total of 72		100%

Most anemic patients were suffering from mild anemia (66.6) when compared with moderate and severe anemia.

**Table 8** Socio-demographic characteristics of the study population.

	Cases number (Yes)	Cases number (No)	Total
Education	93	7	100
Bleeding	60	40	100
Medications	10	90	100
coffee or tea after a meal	58	42	100

In this study, most anemic patients were educated (93%) and 60% suffered from bleeding, whereas 58% always drank coffee or tea after a meal. Iron absorption could be decreased when drinking coffee immediately after a meal, as many studies have demonstrated.

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#### 4. Discussion

Anemia, especially in pregnant women, is a significant problem in developing countries not only to the mother but to the baby's health as well. In this study, the mean Hb concentration was 9.5 g/d in anemic patients. The results showed a high prevalence of anemic patients among pregnant women, 72% out of 100 pregnant women; this high number could reflect that 90% of them did not take iron supplements or folic acid, as shown in Table 8, whereas 58% of pregnant women always drank coffee or tea after a meal. Iron absorption could be decreased when drinking coffee immediately after a meal, as many studies have demonstrated. Anemia levels were higher in our study than in Elzahaf and Omar's study (11) in the northeast of Libya (72% vs. 54.6%); both studies were carried out in cities located at a high level above the sea. Anemia was found more prevalent in the age group between 29 to 38 years old when compared with the other groups, as shown by their Hb and MCV levels, as in table 3 and 4. Moreover, the prevalence of anemia was high during the third trimester of pregnancy, as the concentration of Hb was 9.2% g/dl. Worldwide, 41.8% of pregnant women are anemic compared to 30.2% of non-pregnant women; the most severely affected areas are South-East Asia (48.2%) and Africa (57.1%) (12). We found that the prevalence of anemia was very high in this study; however, 66.6% of participants had mild anemia (with Hb levels below ranged from 9-10.9g/dl), 30.5% had moderate Anemia (Hb levels of 7.0-8.9g/dl). Conversely, another study in Libya mentioned that severities of anemia among the anemic fraction (47%) of the studied population; were distributed as follows: 14.2% had mild anemia, 31.8% had moderate anemia, only 1% had severe anemia (13). In the northwest of Libya also, the prevalence of mild, moderate, and severe anemia was observed as 44.5%, 7.6%, and 2.5%, respectively (11). In Gondar, in the northwest of Ethiopia, anemia was even more prevalent, with (64% for the) mild type, (30%) for the moderate, and (6%) for severe (9). In Nigeria, it was found that 54.5% of pregnant women were anemic (13). Iron deficiency anemia is due to high iron demand. In developing countries, 52% of pregnant women are affected (14). In Egypt, IDA prevalence was 51.3% (1267 of 2470); IDA affects about one in every two pregnant women in rural districts (15). According to our study, 72% of cases had low iron (59.7mcg/dl) and MCV (72fl). Out of 100 pregnant women, 60% had bleeding. However, this could reflect a high rate of anemia. Future analysis, Hb concentrations, and other physiological parameters include a full picture of complete blood count and blood smear. In addition to that, serum transferrin and ferritin would prove useful; however, the diagnosis of iron deficiency depended on low serum iron and low level of transferrin, thus could be since serum ferritin can be reduced in liver disease, inflammation, or cancer disease (10).

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#### 5. Conclusion

The prevalence of anemia, probably IDA, was reported very high among pregnant women in Libya. Therefore, more attention and regular medical checkups and folic acid intake and iron supplements should be considered.

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#### Compliance with ethical standards

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##### *Disclosure of conflict of interest*

The authors declare no conflict of interest.

##### *Statement of informed consent*

Patients in this study gave their informed consent.

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