Study the Incidence, Types of Anemia and Associated Risk Factors in Pregnant Women

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Abstract

Background: Anemia is a global public health problem affecting both developing and developed countries and more prevalent among pregnant women. Worldwide the main cause of anemia during pregnancy is iron deficiency, if remain untreated it might leads to increased risk for perinatal morbidity and mortality.

Aim of the study: is to find an incidence of anemia among pregnant women along with types and severity to assess the association of various maternal characteristics with anemia forms.

Materials and methods: One hundred twenty eight pregnant women were enrolled in this study. Seventy five pregnant women were diagnosed with anemia while fifty three pregnant women without anemia included in this study as a control subjects. Blood samples were collected to determine hemoglobin level and complete blood counts (CBC).

Results: The mean age was 27.76 years for 75 anemia pregnant women and mean of 26.08 years for 53 control non- anemic pregnant women with no statically significant differences (P>0.05). Most of anemic pregnant women had a pregnancy gap ≤ 1 year (51%) while most of non-anemic pregnant women had a gap of > 3 years (62%) with highly significant differences between both groups (P<0.01). Approximately half of anemic pregnant women surveyed found to had a moderate anemia (Hb 7- 9.9 g/dl), one third (32%) of pregnant women is multigravida with moderate anemia type and (62%) of anemic pregnant women found to had Microcytic& Hypochromic anemia. In the present study (80%) of pregnant women receiving iron supplementation, also (73%) receiving folic acid supplement. Only (20%) receiving blood transfusion for severe anemia type.

Conclusion: The results of this research support the idea that the incidence of anemia is still high among pregnant women and iron deficiency anemia is the most prevalent type with anemia became more pronounced at third trimester of pregnancy and mostly with moderate severity type.

Keywords: *Anemia, Pregnant women, Incidence, Types, Risk factors.*

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Introduction

Anemia is a global public health problem affecting both developing and developed countries and more prevalent among pregnant women, young females in reproductive age and young children during the phase of rapid growth [(1)].

Anemia is defined as insufficient number of red blood cells to meet the body's physiologic needs which

vary with age, gender, smoking behavior, and different stages of pregnancy [2].

Worldwide the main cause of anemia during pregnancy is iron deficiency due to inadequate dietary intake, aggravated by the fact of increase demands of the fetus and maternal blood volume expansion [3, 4]. Another cause is genetic predisposition and poor hygiene which might lead to infections during pregnancy in addition to depleted iron stores from too early, too many and too frequent pregnancies [5, 6].

Outcome of anemia during pregnancy includes increased risk for perinatal morbidity and mortality due to the impairment of oxygen delivery to placenta along with increasing risk of preterm deliveries and low birth Weights [7].

The aim of this study to find an incidence of anemia among pregnant women along with types and severity to assess the association of various maternal characteristics with anemia forms.

Materials and Methods

Study design: Cross sectional study conducted during the period from April 2019 until January 2020.

Study population

One hundred twenty eight pregnant women were enrolled in this study. Seventy five pregnant women were diagnosed with anemia during their admission to Al- Yarmouk teaching hospital, in Baghdad. Also Fifty three pregnant women without anemia included in this study as a control subjects.

Blood samples were collected from the pregnant women and hematological investigations were carried out to determine hemoglobin level and complete blood counts (CBC). Questionnaires were also used to obtain demographic information. Gestational age was estimated based on the date of last menstruation and ultrasonography (U/S).

Inclusion and exclusion criteria:

Inclusion criteria include pregnant women irrespective to age, had normal pregnancy, anemia with accidental or symptomatic discovery whatever the term of pregnancy while the exclusion criteria includes: refused to participate, history of anemia due to chronic blood loss, abortion or stopped pregnancy whatever the term.

Hemoglobin levels to diagnose anemia

Anemia severity was classified according to world health organization (WHO) into mild, moderate, severe anemia according to hemoglobin level. For pregnant women non- anemia is considered if hemoglobin level is 110 g/l or higher (11g/dl or higher), mild anemia if hemoglobin level 100-109 g/l (10- 10.9 g/dl), moderate anemia if hemoglobin level is 70-99 g/l (7- 9.9 g/dl), and severe anemia if hemoglobin level lower than 70 g/l (<7g/dl) [2].

Classification of anemia

Anemia is classified into:

1- Microcytic& Hypochromic anemia: mean corpuscular volume (MCV) <80 FL, mean corpuscular hemoglobin (MCH) < 27 pg which occur in iron deficiency anemia, thalassemia, anemia of chronic disease (some cases), lead poisoning, siderobastic anemia (some cases).

2-Normocytic & Normochromic anemia: MCV 80-95 fL MCH ≥ 27 pg which occur in in hemolytic anemia, anemia of chronic disease (some cases), after acute blood loss, renal disease, mixed deficiencies, bone marrow failure (e.g. post chemotherapy, infiltration by carcinoma, etc.).

3- Macrocytic anemia MCV> 95fL occur in megaloblastic: vitamin B12 of folate deficiency, non-megaloblastic: alcohol, liver disease, myelodysplasia, aplastic anemia etc [8].

Statistical Analysis

Statistical analysis of data was performed using SAS (Statistical Analysis System - version 9.1, 2010). Independent t-test was used to assess the differences between patients and control. The percentages were compared by using Chi-square test. $P < 0.05$ is considered statistically significant.

NS: No significant differences ($P>0.05$), (*) Significant difference ($P<0.05$), (**) Highly Significant difference ($P<0.01$).

Results

Table (1) showed the patient demographic and disease characteristics of 128 pregnant women include 75 anemic pregnant women and 53 non -anemic pregnant women with age range 13-44 years and mean age of 27.76 years for anemia pregnant women and age range of 16-45 years and mean of 26.08 years for control non-anemic pregnant women and most of pregnant women in both groups were non-employed 73% and 68% respectively with no statically significant differences (P>0.05).

It can be seen from the data in Table (1) that there is significant differences of education level among studied parameter (P<0.05), even though most of studied population were at university level 39 % and 62 % respectively it was found that 28% for anemic pregnant women were complete only primary school education which might be one of the risk factors for developing anemia among pregnant women.

Interestingly, the present work showed that most of anemic pregnant women had a pregnancy gap ≤ 1 year (51%) while most of non-anemic pregnant women had a gap of > 3 years (62%) with highly significant differences between both groups (P<0.01), table (1).

Table (1): Distribution of pregnant women by their socio-demographic characteristics

Variable	Groups		P- value
	Anemic pregnant women	Non-anemic pregnant women	
Age (year)	27.76± 6.71	26.08± 5.73	0.14 NS
Occupation	n (%)	n (%)	0.50 NS
Employed	20 (27)	17 (32)	
Non-employed	55 (73)	36 (68)	
Education	n (%)	n (%)	0.04*
Illiteracy	4 (5)	0 (0)	
Read and write	3 (4)	1 (2)	
Primary	21 (28)	6 (11)	
Secondary	12 (16)	10 (19)	
University	29 (39)	33 (62)	
Higher	6 (8)	3 (6)	
Pregnancy gap	n (%)	n (%)	<0.0001**
≤ 1 year	38 (51)	6 (12)	
2 years	14 (19)	8 (15)	
3 years	7 (9)	6 (11)	
> 3 years	16 (21)	33 (62)	

Data presented as number (Percentage), mean ± SD

NS: No significant differences (P>0.05), (*) Significant difference (P<0.05), (**) Highly Significant difference (P<0.01).

Approximately half of anemic pregnant women surveyed found to had a moderate anemia (Hb 7- 9.9 g/dl) with highly significant differences (P<0.01), table (2).

Table (2): Classification of anemia by degree of severity among pregnant woman according to world health organization (WHO)

Anemia	n (%)
Mild anemia (Hb 10-10.9 g/dl)	28 (37)
Moderate anemia (Hb 7- 9.9 g/dl)	41 (55)
Severe anemia (Hb <7 g/dl)	6 (8)
P-value	<0.0001**

Data presented as number (Percentage), Hb: hemoglobin, (**) Highly Significant difference (P<0.01).

If we now turn to comparison of anemia classification with gravidity, one third (32%) of pregnant women is multigravida with moderate anemia type.

Higher percentage (52%) of anemic pregnant women found that they were at third trimester of pregnancy; most of them had moderate type (27%) as the demand of iron increased on advanced pregnancy, table (3).

Table (3): Severity of anemia in relation to gravidity and trimester of pregnancy among pregnant women with anemia

Gravidity	Anemia classification			P-value
	Mild	Moderate	Severe	
Primgravida	8 (11)	17 (23)	1 (1)	0.34 NS
Multigravida	20 (27)	24 (32)	5 (6)	
Trimester of pregnancy	Mild	Moderate	Severe	P-value
First trimester (1-13 week)	3 (4)	3 (4)	0 (0)	0.56 NS
Second trimester (14-27 week)	11 (15)	18 (24)	1 (1)	
Third trimester (28-42 week)	14 (19)	20 (27)	5 (6)	

Data presented as number (Percentage), NS: No significant differences (P>0.05).

The most striking result to emerge from the present data is that out of 75 anemic pregnant women 37 had performed complete blood counts and highly significant differences (P<0.01) found as (62%) of them found to had Microcytic& Hypochromic anemia, table (4).

Table (4) Type of anemia among pregnant women with anemia

Type of anemia	Anemic pregnant women	P-value
Microcytic& Hypochromic	23 (62)	0.0002**
Normocytic & Normochromic	11 (30)	
Macrocytic	3 (8)	
Total	37 (100)	

Data presented as number (Percentage), (**) Highly Significant difference (P<0.01).

Table (5) provides an overview of supplementations and treatment intake for anemia throughout the pregnancy, higher frequency (80%) of pregnant women receiving iron supplementation, also (73%) receiving folic acid supplement (knowing that many patients from those percentage receiving both iron and folic acid supplementations) with highly significant differences (P<0.01). Only (20%) receiving blood transfusion for severe anemia type.

Table (5) Supplementations and treatment intake for anemia throughout the pregnancy

Iron supplementation throughout the pregnancy	**n(%)**	***P*- value**
Yes	60 (80)	<0.0001**
No	15 (20)	
Folic acid supplementation throughout the pregnancy	**n(%)**	***P*- value**
Yes	55 (73)	<0.0001**
No	20 (27)	
Blood transfusion	**n(%)**	***P*- value**
Yes	15 (20)	<0.0001**
No	60 (80)	

Data presented as number (Percentage), (**) Highly Significant difference (P<0.01).

Discussion

Approximately one-fourth of the world's population affected by anemia, iron deficiency is the leading cause of anemia allover countries and in both sexes, with women being more affected than man [9, 10].

The present study highlights the incidence of anemia among pregnant women along with risk factors that might predispose pregnant women to anemia.

The education about anemia prevalence and its risk factors to pregnant women is very important. Although in the present work most of pregnant women in both groups found to complete university level, (28%) of anemic pregnant women were found to complete only primary school education which might be one of the risk factors for developing anemia in those patients.

Alem *et al* found that the risk of anemia is (8.8) higher for illiterate pregnant women when compared

with women > 12 educational level [11].

Also a study in China found that the prevalence of anemia among pregnant women was significantly different according to educational level: for college, secondary and primary education the percentage was 52.9, 62.4 and 66.5%, respectively [12].

Also in Jordan a study revealed that only one third of pregnant women had educational level higher than high school [13].

Interestingly, the present work showed that the pregnancy gap might also play a role in developing anemia among studied groups as most of anemic pregnant women showed that had a pregnancy gap ≤ 1 year (51%) while most of non-anemic pregnant women had a gap of > 3 years (62%) with highly significant differences between both groups (P<0.01).

Agreement reported in a study found that (27.6%) of anemic pregnant woman have pregnancy gap of 2 year, (12.3%) have a gap of 3 years and (8.6%) have gap more than 3 years[11].

In this present work (65%) of anemic pregnant women was multigravida. Iron reserves were depleted and anemia occurs in pregnancy with rising number of children. On the other hand, higher percentage (57%) of non- anemic pregnant women also was multigravida and can be illustrated by increased knowledge about anemia prevalence and consequences gained by previous pregnancy experience along with good diet and regular antenatal visit, might neutralize its effect [14].

The present findings seem to be consistent with other research that also conducted in Baghdad which found that the number of anemic pregnant women who primigravida (9.6%) lower than that of pregnant women multipart gravida (45.8%) [15]. About (52%) of anemic pregnant women were in third trimester of pregnancy and (27%) of them had a moderate anemia type while (40%) were in second trimester an only (8%) were in first trimester of pregnancy. The findings of the current study are consistent with those of Alem *et al* and Al –Mehaisen *et al* which found that the prevalence of anemia is higher in third trimester of pregnancy [11,13].

While previous study in Iraq which found that the prevalence of anemia was the highest among pregnant women in 2nd trimester (50.4%) compared to those in the 1st trimester (27.1%) and 3rd trimester (22.5%) and (38.8%) of them had moderate anemia type [16].

The most important clinically relevant finding was that (62%) of anemic pregnant women found to had Microcytic& Hypochromic anemia which is the most common type in pregnancy that occur mostly due to iron deficiency.

This finding confirms the association between the current study and another study at the same region as in Baghdad the majority of anemic pregnant women found to have microcytic &hypochromic anemia [15].

It is somewhat surprising that the majority of pregnant women in the present work found to had a folic acid and iron supplementations for prophylaxis or treatment for already exciting anemia with highly significant differences among study group, despite that they diagnosed with anemia at the time of the study it might be because of most of women enter pregnancy with seriously depleted iron stores [16]. So if there is low iron stores before pregnancy it is difficult to replenish iron stores by diet alone or even with supplementation especially by the last half of pregnancy where the demands increased by expanding blood volume of the mother and the rapidly growing fetus and placenta in addition to low compliance to iron supplementation (gastrointestinal side-effects are believed to be the main reason for limited compliance) all these factors lead to iron deficiency anemia during pregnancy [17-21].

Conclusion

The results of this research support the idea that the incidence of anemia is still high among pregnant women and iron deficiency anemia is the most prevalent type with anemia became more pronounced at third trimester of pregnancy and mostly with moderate severity type.

These findings suggest several courses of action represented by enhanced the education of pregnant women about the risk factors of anemia and possible avoidance and encourage women with childbearing age or desire to became pregnant to had a food rich in iron along with prescreening of hemoglobin and iron before pregnancy to prevent anemia as possible as they can.

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