

Factors Associated with Anemia in A sample of Pregnant Women Attending Primary Health Centers

Muna A. Zeidan, M.Sc *

*Assistant Lecturer, Community Health Department, College of Health and Medical Technologies, Baghdad, Foundation of Technical Education

المستخلص

الهدف: الهدف من الدراسة هو تحديد نسبة فقر الدم لعينة من النساء الحوامل ، وللتعرف على العوامل المرتبطة بفقر الدم (كالعمر ، تعليم الام، عمر الحمل ، عدد الاطفال . عدد مرات الحمل، فترة المباشدة بين حمل واخر، التدخين، تناول الحديد، العادات الغذائية).
المنهجية: : دراسة مقطعية اجريت في المركز الصحي في الوشاش والمركز الصحي في باب المعظم عينة غرضية وحجم العينة كان ٥٥٠ . والدراسة قد بدأت في الاول من مارس عام ٢٠١١ ولغاية ٣٠ مارس ٢٠١٢ . حيث جمعت المعلومات والبيانات باستخدام استبانة معدة مسبقا للحصول على المعلومات الاجتماعية والديموغرافية.
النتائج: اظهرت الدراسة ان متوسط اعمار عينة الدراسة هو ٢٦,٥±٧,٥ سنة ، وحوالي ٨٥,٨% من العينة كن ربوات بيوت ، وحوالي ٤٥,٦% من العينة يعانون من فقر الدم، وحوالي ٥٢,٢% من النساء الحوامل والمصابات بفقر الدم كانت بشكل رئيسي في الثلث الثالث من مرحلة الحمل.
 بعد تحليل النتائج بطريقة (مربع كاي) تبين وجود ترابط معنوي واضح بين فقر الدم و(العمر ، تعليم الام، مرحلة الحمل، عدد الاطفال . عدد مرات الحمل، فترة المباشدة بين حمل واخر، والتدخين، تناول الحديد، العادات الغذائية).
التوصيات:توصي الدراسة باهمية ان تكون الاولوية للتثقيف الصحي والخدمات الاجتماعية الاخرى في الحد من حدوث فقر الدم اثناء الحمل.

Abstract:

Objective (s): To determine proportion of anemia among sample of Pregnant women. To identify factors associated with the anemia (Maternal age, maternal education, gestational age, parity, gravidity, birth interval, smoking, taking iron supplements and dietary habits).

Methodology: A cross-sectional study conducted at Al- washash & Bab-almoadham primary health care centers. The sample was selected by (non-probability convenient sampling) and sample size was (550). The study started from 1st March 2011 to 30th of March 2012. The data was collected by direct interview using special questionnaire to obtained socio-demographic information.

Results: the result shows that mean age of the subjects was 26.5± 7.5 years, 85.8% were housewives; about (45.6%) of pregnant women in the sample were anemic. About (52.2%) of the pregnant women with anemia were mainly at 3rd trimester of their pregnancy. Analysis of results by chi-square test show that (Maternal age, maternal education, gestational age, parity, gravidity, birth interval, smoking, taking iron supplements and dietary habits) were significant factors associated with anemia.

Recommendations: the present study recommends that priority should be given to provide education and other social services in on the prevention of pregnancy-induced anemia.

Key words: Anemia, Factors, Pregnant women

Introduction:

Anemia in pregnancy remains one of the most intractable public health problems in developing countries. It is extremely common and although not always shown to have a causal link, severe anemia contributes to maternal morbidity and mortality^(1, 2, and 3). Anemia is defined as the condition in which there is decreased level of hemoglobin than the normal or there is decreased number of RBC's than the normal value⁽⁴⁾. WHO has recommended a cut off value of 11.0 g/dl for hemoglobin to define anemia at any time during pregnancy⁽⁵⁾. A high proportion of women in both industrialized and developing countries become anemic during pregnancy.

Estimates from the World Health Organization report that from 35% to 75% (56% on average) of pregnant women in developing countries, and 18% of women from industrialized countries are anemic⁽⁶⁾. Patients of anemia usually have various symptoms especially generalized weakness, easy fatigability and poor concentration etc. If anemia is marked and prolonged it may precipitate cardiac problems. Anemia in pregnancy is a special issue. Here anemia has deleterious effects both on mother as well as on growing fetus⁽⁷⁾. It may lead to premature delivery, low birth weight and fetal death⁽⁸⁾. Anemia, even when mild to moderate affects the sense of well-being resulting in fatigue, stress and reduced work productivity⁽⁹⁾. During labor, women with severe anemia are less able to endure moderate blood loss and as a consequence are at a higher risk of requiring a blood transfusion during delivery⁽¹⁰⁾. Firstly, anemia makes women more susceptible to deaths from hemorrhage by lowering their hematological reserves for blood loss especially at birth.

Severe anemia is associated with increased susceptibility to infection due to lowered resistance to disease, and Hb<4 g/dl is also associated with high risk of cardiac failure, particularly during delivery or soon after, making the woman likely to

die if unable to reach good health facilities immediately⁽¹¹⁾.

Anemia in pregnancy is mainly due to Iron deficiency^(7, 8) by correction of anemia at proper time we can improve maternal and fetal outcome⁽¹²⁾.

The probable predisposing factors for anemia in pregnant women include parity, low socioeconomic status and substance abuse among others⁽¹⁾.

The aims of the study are to determine rate of anemia among sample of pregnant women and to identify factors associated with the anemia (Maternal age, maternal education, gestational age, parity, gravidity, Birth interval...ect).

Methodology:**Samples:**

Al- washash & Bab-almoadham primary health care centers were chosen for this study and the design of the study was cross-sectional. The sample was selected by convenient sampling) and sample size was (550). The study started from 1st March 2011 to 30th of March 2012.

The data was collected by direct interview using special questionnaire to obtain socio-demographic information (age, education, parity, gravidity, and birth space interval, Smoking, taking iron supplements, dietary habits).

Setting:

Hemoglobin concentration was based on the last routinely collected reading using the haemoglobinometer method. This method uses blood samples drawn from either capillary or venous blood. For this study, anemia was defined according to the WHO criteria of haemoglobin (Hb) below 11 g/dL⁽¹³⁾. Anemia was further categorized into 3 levels; mild 9-10.9 g/dL, moderate 7-8.9 g/dL and severe <7 g/dL⁽¹⁴⁾.

Dietary habits were divided by the following⁽¹⁵⁾:

- Poor dietary habits (those taking meat, eggs or poultry less than twice per week).
- Satisfactory dietary habits (those taking meat, eggs or poultry 2-3 per week).

- Good dietary habits (those taking meat, eggs or poultry daily).

Statistical analysis:

Data was analyzed by SPSS package version 18, X² tests was used for significance of association p value of <0.05 was considered significant.

Results:**Table 1.** Distribution of sample according to age, occupation and anemia

Age (years)	No. = 550	%
<20	71	12.9
20-29	343	62.4
30-39	135	24.5
≥40	1	0.2
Mean age (26.5± 7.5)		
Occupation	No. = 550	%
House wife	472	85.8
Working	65	11.8
Student	13	2.4
Anemia	No. = 550	%
Normal (>11g\dl)	299	54.4
Mild (9-10.9 g\dl)	142	25.8
Moderate (7-8.9 g\dl)	100	18.2
Severe (<7 g\dl)	9	1.6

No. = Number; % = percent; g\dl = grams per deciliter

This table shows that of the highest percentage (62.4%) pregnant women in age group (20-29) years & mean age of them was 26.5 ± 7.5 years. As for occupation (85.8%) was housewives and about (11.8%) were working women, (45.6%) were anemic & (54.4%) were having Hb level within normal range.

Table 2. Distribution of the study group by severity of anemia and age

Age (years)	Severity of Anemia					p. value
	Normal	Mild	Moderate	Severe	Total	
<20	5 7.0%	27 38.0%	34 48.0%	5 7.0%	71 100%	χ ² = 163.8 p≤0.0001 H.S
20-29	223 65.0%	69 20.1%	49 14.3%	2 0.6%	343 100%	
30-39	71 52.6%	46 34.1%	17 12.6%	1 0.7%	135 100%	
≥40	-	-	-	1 100%	1 100%	
Total	299 54.4%	142 25. %8	100 18.2%	9 1.6%	550 100%	

%= percent; χ²= chi-squared test; P= probability level; H.S= highly significant

This table shows that pregnant women in age less than 20 year had higher rate of anemia (93%). Results found highly significant as p-value was ≤ 0.0001 .

Table 3. Distribution of the study group by severity of anemia and educational status

Education	Severity of Anemia					p. value
	Normal	Mild	Moderate	Severe	Total	
Poor level	44 36.6%	38 31.7%	33 27.5%	5 4.2%	120 100%	$\chi^2= 52.9$ $p\leq 0.000$ H.S
Intermediate level	177 63.4%	71 25.5%	29 10.4%	2 0.7%	279 100%	
Good level	78 51.4%	33 21.8%	38 25.2%	2 1.3%	151 100%	
Total	299 54.4%	142 25.8%	100 18.2%	9 1.6%	550 100%	

%= percent; χ^2 = chi-squared test; P= probability level; H.S= highly significant

This table shows the relationship between anemia & education level of the most pregnant with anemia were at were poor level 120 (63.4%) of these 38 (31.7%) had mild anemia while 33 (27.5%) were moderate. Results are highly significant as p- value was ≤ 0.000 .

Table 4. Distribution of the study group by severity of anemia and pregnancy trimester

Pregnancy trimester	Severity of Anemia					p. value
	Normal	Mild	Moderate	Severe	Total	
1 st (≤ 12 weeks)	7 29.2%	8 33.3%	4 16.7%	5 20.8%	24 100%	$\chi^2= 76.0$ $p\leq 0.000$ H.S
2 nd ($\leq 13-24$ weeks)	165 63.4%	61 23.5%	33 12.7%	1 0.4%	260 100%	
3 rd (≥ 25 weeks)	127 47.8%	73 27.4%	63 23.7%	3 1.1%	266 100%	
Total	299 54.4%	142 25.8%	100 18.2%	9 1.6%	550 100%	

%= percent; χ^2 = chi-squared test; P= probability level; H.S= highly significant

This table shows the association of anemia and pregnancy trimester most pregnant with anemia were at 3rd (≥ 25 weeks) 139 (52.2%) of these 73 (27.4%) had mild anemia while 63 (23.7%) were moderate result is highly significant as p- value was ≤ 0.000 .

Table 5 . Distribution of the study group by severity of anemia and parity

Parity	Severity of Anemia					P.value
	Normal	Mild	Moderate	Severe	Total	
0	18 40 %	10 22.2 %	15 33.3 %	2 4.5%	45 100%	$\chi^2= 42.0$ $p \leq 0.000$ H.S
1-3	238 59.9 %	107 27 %	48 12.1%	4 1.0%	397 100%	
≥ 4	43 39.8 %	25 23.1 %	37 34.3%	3 2.8%	108 100%	
Total	299 54.4 %	142 25.8 %	100 18.2%	9 1.6%	550 100%	

%= percent; χ^2 = chi-squared test; P= probability level; H.S= highly significant

This table shows the relationship between anemia and parity. The study sample presents that there was a highly significant relationship between the two factors at ($p < .000$), about 108 pregnant women were with parity ≥ 4 and out of these 65 (60.2%) were anemic, of these 25 (23.1%) had mild anemia, 37 (34.3%) had moderate anemia, while 3 (2.8%) were in severe anemia.

Table 6 . Distribution of the study group by severity of anemia and Gravidity

Gravidity	Severity of Anemia					P. value
	Normal	Mild	Moderate	Severe	Total	
1-3	198 54.1%	88 24.1%	77 21.0%	3 0.8%	366 100%	$\chi^2= 43.4$ $p \leq 0.000$ H.S
4-6	94 61.4%	41 26.8%	16 10.5%	2 1.3%	153 100%	
>6	7 22.6%	13 41.9%	7 22.6%	4 12.9%	31 100%	
Total	299 54.4%	142 25.8%	100 18.2%	9 1.6%	550 100%	

%= percent; χ^2 = chi-squared test; P= probability level; H.S= highly significant

This table shows about 21% pregnant women had more than 6 pregnancies and out of these 24 (77.4%) were anemic, and anemia ranged between mild anemia (41.9%) & moderate anemia (22.6%) with p- value ≤ 0.000 .

Table 7. Distribution of the study group by severity of anemia and birth interval

Birth space interval	Severity of Anemia					p. value
	Normal	Mild	Moderate	Severe	Total	
<24 months	216 47.6%	138 30.4%	93 20.5%	7 1.5%	454 100%	$\chi^2=50.9$ $p\leq 0.000$ H.S
≥ 24 months	83 86.4%	4 4.2%	7 7.3%	2 2.1%	96 100%	
Total	299 54.4%	142 25.8%	100 18.2%	9 1.6%	550 100%	

%= percent; χ^2 = chi-squared test; P= probability level; H.S= highly significant

This table shows that pregnant women with birth interval (less than 24 months) had higher rate of mild anemia (30.4%) and moderate anemia (30.4%) high significant difference were found as p- value ≤ 0.000 .

Table 8. Distribution of the study group by severity of anemia and smoking

Smoking	Severity of Anemia					value
	Normal	Mild	Moderate	Severe	Total	
Yes	156 59.8%	67 25.7%	34 13.0%	4 1.5%	261 100%	$\chi^2=9.97$ $p\leq 0.019$ S
No	143 49.5%	75 26%	66 22.8%	5 1.7%	289 100%	
Total	299 54.4%	142 25.8%	100 18.2%	9 1.6%	550 100%	

%= percent; χ^2 = chi-squared test; P= probability level; H.S= highly significant

This table shows that pregnant women with no smoking had higher rate of mild anemia (26%). Results found highly significant as p-value was ≤ 0.019 .

Table 9. Distribution of the study group by severity of anemia and taking iron supplement

taking iron supplements	Severity of Anemia					p. value
	Normal	Mild	Moderate	Severe	Total	
Yes	259 68.5%	77 20.4%	39 10.3%	3 0.8%	378 100%	$\chi^2=105$ $p\leq 0.000$ H.S
No	40 23.2%	65 37.8%	61 35.5%	6 3.5%	172 100%	
Total	299 54.4%	142 25.8%	100 18.2%	9 1.6%	550 100%	

%= percent; χ^2 = chi-squared test; P= probability level; H.S= highly significant

This table shows the relationship between anemia and taking iron supplements, about 378 of pregnant women were taking iron supplements, out of these 119 (31.5%) were anemic, 77 (20.4%) were having mild anemia and 39 (10.3%) were having moderate anemia, 172 pregnant women were not taking iron supplements, out of these 132 (76.8%) were anemic, 65 (37.8%) had mild anemia and 61 (35.5%) had moderate anemia and 6 (3.5%) had severe anemia. The results present high significant association between the two factors at ($p \leq 0.000$).

Table 10. Relationship of anemia with dietary habits

Dietary habits	Severity of Anemia					p. value
	Normal	Mild	Moderate	Severe	Total	
Poor	77 41.4%	75 40.3%	29 15.6%	5 2.7%	186 100%	$\chi^2 = 103$ $p \leq 0.000$ H.S
Satisfactory	42 37.5%	20 17.9%	49 43.8%	1 0.8%	112 100%	
Good	180 71.4%	47 18.7%	22 8.7%	3 1.2%	252 100%	
Total	299 54.4%	142 25.8%	100 18.2%	9 1.6%	550 100%	

%= percent; χ^2 = chi-squared test; P= probability level; H.S= highly significant

This table shows that pregnant women having poor Dietary habits 109 (58.6%) were anemic, 75 (40.3%) were having mild anemia, and 29(15.6%) had moderate anemia ,of these 112 pregnant women having satisfactory Dietary habits 70 (62.5%) were anemic , 20 (17.9%) of them were with mild anemic and 49(43.8%) were with moderate anemia. Out of the 252 with good Dietary habits only 72 (28.6%) were anemic It results present that there was a high significant relationship between the two factors.

Discussion:

Anemia is a major health problem that affects 25% to 50% of the population of the world the prevalence of anemia in pregnancy shows great variations in different parts of the world. Studies from industrialized countries show that 45% of pregnant women have a Hb less than 11 whereas the prevalence is generally higher and the variation is greater in developing countries with 90% anemia ⁽¹⁶⁾. Anemia in pregnancy is associated with increased rates of maternal and perinatal mortality, premature delivery, low birth weight and other adverse outcomes ⁽¹⁷⁾.

In this study, most of the pregnant belongs to the age 20-29 years and the

mean age of pregnant women was 26.5 ± 7.5 years. The finding of the present study is agreement with findings reported in Karachi ⁽¹⁵⁾, in Iran ⁽¹⁸⁾. (17.9%) were with mild anemia and in Tanzania ⁽¹⁹⁾.

In Turkey ⁽²⁰⁾, they have identified young age as a risk factor.

Anemia during pregnancy, this could be explained by the extreme ages of reproductive years are well know risk factors for anemia during pregnancy. This study shows that about (85.8%) of pregnant women were housewives, the finding of the present study is an agreement with finding , reported in Turkey ⁽²⁰⁾, found a high percentage (94%) of the pregnant women

were housewives this could be a possible reason for women having health problem during their pregnancy⁽²⁰⁾. 1.6% of the subjects had had severe anemia while (18.2%) were moderately anemic and (25.8%) had mild anemia the finding of the present study is disagrees with findings reported in Karachi⁽¹⁵⁾, in India⁽²¹⁾, they found none of the subjects had severe anemia while (60.14%) were moderately anemic and (39.86%) had mild anemia, a possible explanation for this may be due to the contrast in time and place of the studies and selection of study population. Being illiterates found to affect the occurrence of anemia in pregnancy compared to being educated pregnant women this result confirms the finding in Saudi Arabia⁽²²⁾, in Karachi⁽¹⁵⁾, in Malaysia⁽²³⁾, they found that maternal illiteracy have significant association with anemia, this could be explained by pregnant women usually had limited knowledge and understanding concerning anemia and it's influence on health and the necessity for nutrition during pregnancy, clearly indicated that the education level of pregnant women plays a very important role in the identification and solution to anemia⁽²⁰⁾.

Gestational age strongly associated with anemia in pregnancy p – value <0.000 . the finding of the present study in agreement with findings reported in Pakistan⁽⁷⁾, in Iran⁽¹⁸⁾, in Tanzania⁽²¹⁾, in Turkey⁽²²⁾, in Saudi Arabia⁽²²⁾, in Malaysia⁽²³⁾, in Nigeria⁽¹¹⁾, they found high frequency of anemic patients in 3rd trimester this could be explained in normal pregnancy, the expansion of the plasma volume which precedes the increase in red cell mass, creates a disproportionate expansion of plasma volume (50%) compared with the increase in red cell mass (30%). Therefore, “hemoglobin values start to decline during the early phase of first trimester and reach their nadir near the end of second trimester⁽²⁴⁾. Parity have significant association with anemia in pregnancy with p – value <0.000 ,

the finding of the present study is disagrees with findings reported in India⁽²⁸⁾, and in Sudan⁽²⁵⁾, they found no significant association between anemia and parity. But this result was similar to study in Karachi⁽¹⁵⁾ in Iran⁽¹⁸⁾, in Tanzania⁽¹⁹⁾, in Turkey⁽²⁰⁾, in Saudi Arabia⁽²²⁾, in Malaysia⁽²³⁾, and in Nigeria⁽¹¹⁾, identified increased parity 0-9 have also been associated with more anemia this may be because underlying cause being depleted iron stores^(26, 27). Anemia was higher among pregnant women who had more than 6 pregnancy, the same result were seen in Karachi⁽¹⁵⁾, in Turkey⁽²⁰⁾, & in Malaysia⁽²³⁾, reported increased gravidity was 1-10 have been associated with more anemia this might be explained by underlying cause being depleted iron stores^(26, 27). Significant association was found between the last birth intervals and anemia, pregnant who conceived within less than 24 months, were at greater risk of having anemia when compared with normal group. Similar finding were reported in Saudi Arabia⁽²²⁾, in South Malawi⁽²⁸⁾, & in Southern Malawi⁽²⁹⁾, they found strong significant association of birth intervals < 24 months with anemia in pregnancy, this may be due to increased demand of micronutrients during this period in the background of poor dietary habits^(7,30). The present study shows that pregnant women who had smoker had higher rate of anemia about (40.2%), this result confirms the finding in Iran⁽¹⁸⁾, found that mean hemoglobin levels were significantly lower in smoker compared with non smokers with ($p \leq 0.001$), this may be due to Substance abuse during pregnancy is an increasing problem that is associated with significant maternal and fetal morbidity⁽³¹⁾. Anemia was high among pregnant women who do not taking iron supplement. The same results were seen in Iran⁽¹⁸⁾, in Malaysia⁽²³⁾, in Pakistan⁽³²⁾, in Karachi⁽¹⁵⁾; they found anemia less common in ladies taking oral iron supplements compared with ladies who were not taking oral iron supplements.

This could be explained iron supplements can reduce the extent of iron depletion in the third trimester ⁽⁶⁾. Dietary habits also affect the hemoglobin level in pregnant women in our study, 58.6% of anemic pregnant women were having poor Dietary habits, the same results were seen in Karachi ⁽¹⁵⁾, in Pakistan ⁽³²⁾, and they found iron deficiency as an important cause of anemia in pregnancy. This may be due to pregnant women with poor nutrition it is exposure to anemia due to iron deficiency and folic acid deficiency and vitamin B2 deficiency.

Recommendations:

Teach women at child bearing age good long – term dietary habits as a part of an overall approach to health promotion, and education about dangers anemia on both pregnant women and infant by health lectures, T.V., Posters to avoid future anemia during pregnancy. All pregnant women should be screened for anemia, and those with iron deficiency anemia should be treated with supplemental iron, in addition to prenatal vitamins. Health education and encourage pregnant mothers about important family planning (space) and good nutrition. Encourage pregnant mothers to visit the health center early and regularly.

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