



Anemia and Associated Risk Factors among Pregnant Women in Al Karkh Health Directorate, Baghdad / Iraq

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**فقر الدم وعوامل الخطورة المرتبطة به لدى النساء الحوامل
في دائرة صحة الكرخ - بغداد - العراق**

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Abstract

Introduction: Anemia in pregnancy is one of the most common public health problems in developing country, it is commonly associated with poor pregnancy outcome and can result in complications that threaten the life of both mother and fetus. The main risk factors associated with anemia during pregnancy are low body storage of iron, low intake of iron, poor absorption of iron from diet, chronic infections, and parasitic diseases .

Objective: To determine the prevalence of anemia and associated risk factors among pregnant women attending antenatal care units in Baghdad Al Karkh Health Directorate, Baghdad/Iraq .

Materials and Methods: Descriptive cross-sectional study, included 400 pregnant women attended antenatal care clinic at 12 primary health care centers (3 from each of the 4 health care districts that were selected according to geographical area) in Baghdad Al-Karkh Health Directorate. the study was conducted from February -April 2019. Data were collected through a questionnaire especially designed by the researchers which included socio-demographic factors, obstetric history, nutritional habits and iron-folate supplement intake, measuring of hemoglobin level was done using hemoglobin meter then data entry and analysis were done using statistical program Statistical Package for the Social Sciences (SPSS) version : 16.

Results: prevalence of anemia was 53%, mostly (79%) of moderate type. Anemia was significantly associated with history of less than two years inter pregnancy interval and multiparity it was also associated with irregular intake of iron-folate supplement and unhealthy food habit .

Conclusion: high prevalence of anemia in this study and its association with factors related to food habit, family planning and iron-folate supplement



intake is highly recommended that more effective educating programs about the importance of balanced diet and family planning have to be started early in reproductive life of women and raise awareness about the importance of regular intake of iron-folate supplement during pregnancy.

Keywords : Anemia ,Risk factors , Pregnant , Health care.

المستخلص

المقدمة: يعتبر فقر الدم عند النساء الحوامل من أكثر مشاكل الصحة العامة شيوعاً في البلدان النامية وعادة ما يرتبط بسوء نتائج الحمل حيث يمكن أن يؤدي إلى مضاعفات تهدد حياة الأم والجنين مما يؤدي الى زيادة معدلات المراض والوفيات ما حول الولادة ومن أهم عوامل الخطورة التي لها علاقة بفقر الدم اثناء الحمل ويضعف مخزون الحديد في الجسم، عدم تناول مركبات الحديد خلال الحمل او عدم امتصاصه بسبب تعارضه مع مركبات اخرى، الالتهابات المزمنة والإصابة بالطفيليات.

الهدف: لتحديد مدى انتشار فقر الدم وعلاقته بعوامل الخطورة بين النساء الحوامل المراجعات لوحدات الرعاية في مراكز الرعاية الصحية الأولية في دائرة صحة بغداد الكرخ.

طريقة العمل: دراسة وصفية مقطعية تضمنت 400 حاملا ممن راجعن وحدات الرعاية في 12 مركز رعاية صحية اولية (تم اختيار 3 مراكز صحية عشوائيا من كل قطاع من القطاعات الاربعة التي تم اختيارها حسب الرقعة الجغرافية) في دائرة صحة بغداد الكرخ للفترة من شباط -نيسان 2019. تم جمع البيانات من خلال المقابلة المباشرة للحامل باستخدام استمارة اعدت من قبل الباحثين، تضمنت الاستمارة أسئلة حول المعلومات الشخصية للحامل، التاريخ التوالدي، العادات الغذائية بالإضافة الى الالتزام بتناول حبوب الفيروفوليك بعد الشهر الثالث من الحمل كما تم تسجيل نسبة هيموغلوبين الدم بعد قياسه باستخدام الجهاز المعتمد في المراكز المذكورة، ادخلت البيانات وتم تحليلها من خلال برنامج احصائي (الحزمة الاحصائية للعلوم الاجتماعية اصدار16).



النتائج: بلغ معدل انتشار فقر الدم بين عينة البحث 53% وكان في الغالب (79%) من النوع المعتدل كما تبين من خلال البحث وجود علاقة احصائية يعتد بها بين فقر الدم اثناء الحمل وبعض عوامل الخطورة الخاصة بالتاريخ التوالدي (الفترة بين حمل واخر اقل من سنتين، تعدد الاحمال) ,العادات الغذائية غير الصحية وعدم انتظام تناول حبوب الفيروفوليك بعد الشهر الثالث من الحمل.

الاستنتاج: ارتفاع معدل فقر الدم في عينة البحث وعلاقته بعوامل تتعلق بالعادات الغذائية ,تنظيم الاسرة وعدم انتظام تناول حبوب الفيروفوليك بعد الشهر الثالث من الحمل تجعل من الضرورة ايجاد برامج صحية فعالة للإرشاد والتوعية الصحية للنساء قبل الحمل حول العادات الغذائية السليمة واهمية تنظيم الاسرة والمباعدة بين الولادات وخلال فترة الحمل حول أهمية الالتزام بتناول حبوب الفيروفوليك بعد الشهر الثالث من الحمل.

الكلمات المفتاحية: فقر الدم ,عوامل الخطورة ,الحوامل ,الرعاية الصحية.



Introduction

Anemia is a global public health problem occurs at all stages of life but it is more prevalent during pregnancy due to high iron needs (Hussein & Ali, 2012, PP4). World Health Organization (WHO) has defined anemia in pregnancy as the hemoglobin (Hb.) concentration of less than 11 g/dl (WHO, 2015), Anemia in pregnancy is a major public health problem, especially in developing countries according to (World Health Organization) classification Prevalence of anemia of $\geq 40\%$ in a population is classified as a severe public health problem) It affects 41.8% of pregnant women globally (Abdul Wahid and Ahmed 2017). it is found to be 50% in India, 43% in Bahrain, 39% in Algeria and 37%, 36% and 34% of pregnant women in Jordan, Turkey and Iran respectively (WHO, 2016). In Iraq the prevalence was 37.9% in 2007 (Iraqi family health survey (IFHS), 2007) and increased in 2012 to 39.4% where a study done by Iraq Nutrition Research Institute but this study excluded Baghdad Al-Karkh Health Directorate and Kurdistan Governorates needs (Hussein and Ali, 2012). since that time there was no survey about anemia during pregnancy done in Iraq.

Regarding the main risk factors associated with anemia during pregnancy, they are either due to low intake or poor absorption of iron (because of high phytate compound in diet), chronic infections or parasitic diseases. Bleeding, haemoglobinopathies and demographic, cultural, and socioeconomic factors (in developing countries) can affect the occurrence of anemia in pregnancy as well (Stephen, et al., 2018 and Ahmed, et al., 2013).

Although routine iron-folate supplementation to all pregnant women (starting from the second trimester of pregnancy) has been established for a decades in Iraq, anemia in pregnancy is one of the most common preventable



causes of maternal morbidity and poor perinatal outcome and still on top of the list of risk factors associated with pregnancy (*MOH, Annual Statistical Report, 2015, 2016 and 2017*).

In this study aim to determine the prevalence of anemia and associated risk factors among pregnant women attending antenatal care units in Baghdad Al-Karkh Health Directorate (DOH).

Materials and Methods

Setting: Design of the study, when and where

A cross sectional study conducted among pregnant women attended antenatal care (ANC) units in Primary Health Care Centers (PHCC) in Baghdad Al-Karkh Health Directorate during the period between February–April 2019, four district, from a total 10 districts were selected according to geographical area (Al-Kademia from North, Al Elam from South, Al-Dura from East and Abu Grab from West) then 3 PHCCs from each district were randomly selected. (Twelve Primary Health Care Centers were studied from a total of 104 PHCCs in Baghdad Al-Karkh Health Directorate).

Population, inclusion and exclusion criteria

pregnant women at any age who were in the 1st, 2nd and 3rd trimester of pregnancy, lived within the geographical area of the selected health centers and accepted to participate were included while pregnant women who had history of Thalassemia, sickle cell anemia, hypertension, renal disease, thyroid disease were excluded.



Sample size and sampling

a purposive sample of 400 pregnant women were included in the study (sample size estimated using the general formula for targeted population size, allowed error 5% and prevalence of anemia in the population supposed to be 50% and confidence interval of 95%).

Definition of variable, study procedure and data collection tool

Conceptual definition of anemia

a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs.

Operational definition of anemia

Hemoglobin level of less than 11 gm./dl or hematocrit level less than 33%, at any point during pregnancy.

Data were collected through irregular visits to the included primary health care centers (3 visits /week) level of Hemoglobin was measured to each pregnant women included in the study with Hemocuehemoglobin meter machine by the laboratory health worker.

Laboratory methods: Hemoglobin was measured on site, using a drop of whole blood collected in micro cuvette, with the HemoCue haemoglobimeter machine which was calibrated before. The severity or level of anemia was determined as following: Mild (hemoglobin level between 10.0- 11 gm./dl), Moderate (hemoglobin level between 7.0- 9.9 gm./dl), Sever (hemoglobin level less than 7 gm./dl) (Prakash *et al.*, 2015).

A self-designed questionnaire contained a socio demographic, obstetrical history, diet habit and intake of iron foliate as a preventive



measures given during the second trimester of pregnancy were filled through face to face interview with the pregnant women.

Data collection and analysis

After data collected an electronic data form designed using the Statistical Package for Science Services (SPSS version 16) program for analysis. Categorical variable was summarized as numbers and percentages presented in form of tables and chi square test used to assess the association between anemia and the risk factors all variables with a p- value less than 0.05 were considered as statistical significance.

Ethical issues

Official approval from the scientific committee in the DOH and the included health districts and PHCCs was obtained, during interviews, aim of the study was explained to all participants, verbal consent was taken from each pregnant woman before enrolled in the study and privacy of the participants was respected during collection of data.

Limitation of the study

The study did not cover other known factors associated with anemia such as parasitic infestation (by doing stool examination).

Results

This study enrolled 400 pregnant women the socio demographic characteristics of the studied sample in Table (1) showed that the highest percentage(36%) were between 18-25 years, while the lowest (18%)were



less than 18 years. It also showed that about half (53.8%) of them had low level of education (illiterate, read and write or primary education) and most of them (90.5%) were housewife while three quarter of their husbands (75.0%) were governmental employee.

Table 1. Distribution of the study sample according to socio-demographic characteristics.

Variables		Frequency No.	Percentage %
Age group of pregnant women	less than 18	73	18
	18- 25	142	36
	26- 34	109	27
	35 and more	76	19
Education level of pregnant women	Illiterate	79	19.8
	Read and write or primary	136	34.0
	Intermediate and secondary	116	29.0
	Institution and collage	69	17.2
Occupation of pregnant women	House wife	362	90.5
	Governmental employee	18	4.5
	Non- Governmental employee	20	5.0
Occupation of Husband	Governmental employee	300	75.0
	Non- Governmental employee	100	25.0

The prevalence of anemia in the study sample constituted 53% mostly of moderate type (79%) as showed in Table (2)

Table 2. Prevalence and severity of anemia among study sample.

Prevalence	Frequency No.	Percentage %
Anemic	217	53
Non-anemic	183	47
Total	400	100
Severity of anemia		
Moderate	172	79
Mild	45	21
Total	217	100



Regarding the socio-demographic characteristic of the anemic pregnant women about fifth of them were less than 18 years(20%) and only 20% had institution or collage education also most of them were housewife (88%)and their husband were governmental employee(75%) as showed in Table (3).The table also showed that there was statistical significant association between anemia and occupation of the anemic pregnant women ($p = 0.044$), while there was no significant association with other socio demographic variables.

Table 3. Association of anemia with socio-demographic characteristic

Variables characteristic		Anemic	P-value Chi-square test
Age group of pregnant women	less than 18	43 (20%)	0.937
	18- 25	76 (35%)	
	26- 34	56 (26%)	
	35 and more	42 (19%)	
Educational level of pregnant women	Illiterate	38 (18%)	0.127
	Read and write and primary	67 (31%)	
	Intermediate and secondary	68 (31%)	
	Institution and collage	44 (20%)	
Occupation of pregnant women	House wife	190 (88%)	0.044
	Governmental employee	13 (6%)	
	Private employee	14 (6%)	
Occupation of Husband	Governmental employee	163 (75%)	0.897
	Private employee	54 (25%)	

Regarding obstetric history the highest percentage of the anemic pregnant women were multipara (74%)in the second trimester of pregnancy (47%) (those in the first trimester constituted 36% and in the third 17 %)with less than two years inter-pregnancy interval (54%),received ANC care at public sector(53 %) and had no history of bleeding(88%),abortion(80 %),stillbirth



(% 86) or live birth (%65). There was a statistically significant association between anemia and all previous variables except the place of providing antenatal care ($p = 0.161$), as shown in Table (4).

Table 4. Association of anemia with obstetrical history

Variables characteristic	Anemic	P-value Chi-square test
Trimester	1st trimester	79 (36%)
	2nd trimester	102 (47%)
	3rd Trimester	36 (17%)
history of bleeding	Ante partum hemorrhage	25 (12%)
place of providing antenatal care ANC	Public	116 (53%)
	Private	101 (47%)
Parity	Prime Para	56 (26%)
	Multi Para	161 (74%)
Inter pregnancy interval	Less than 2 years	87 (54%)
	2 years or more	74 (45%)
Still birth	No still births	138 (86%)
	≥ 1	23 (14%)
Abortion	No abortions	129 (80%)
	≥ 1	32 (20%)
Live births	No live birth	105 (65%)
	≥ 1	56 (35%)

Table (5) showed food habit of the anemic pregnant women where more than half of them (58%) either daily or sometimes drinking tea after main meal but most of them (94%) eating animal source of food rich with iron. A significant association between anemia and food habit of the pregnant women was found (p value = 0.000).



Table 5. Association of anemia with food habit.

Variables characteristic		Anemic	P-value Chi-square test
Drinking tea after main meal	Yes daily	42 (19%)	0.000
	Some times	85(39%)	
	NO	90 (41%)	
Eating animal source of food rich with iron	Yes weekly	78 (36%)	0.000
	Sometimes	126 (58%)	
	NO	13 (6%)	

Regarding supplement (**iron foliate**) intake about three quarter (71%) of the anemic women either not take them or irregularly taking them and there was significant association between anemia and the intake of them with a P value = 0.004 as showed in Table (6).

Table 6. Association of anemia with supplement intake (iron foliate).

Supplement intake								
Non-intake		Regular intake			Irregular intake			Total
No.	%	No.	%	P-value	No.	%	P-value	
12	9	40	29	0.355	86	62	0.004	138

Discussion

The prevalence of anemia in the study sample constituted 53% which indicate a severe public health problem which is coincident with a study done in Iraq/ Baghdad (*Khalil, 2017*), in Al-Samawa by (*Hussain and Younis, 2019*), in Egypt by (*Elzeiny, et al., 2019*), Yemen by (*Wahdan, et al., 2017*) and Ethiopia by (*Meleko, et al., 2017*) but the prevalence of the current study was higher than that found in a study done in Iraq/Baghdad (*Alfatah, et al., 2018*), in Turkey by (*Pehlivan, et al., 2010*,) and in Tanzania by (*Mgongo, et al., 2018*).



Regarding the severity of anemia, 79 % classified as moderate anemia and 21% as mild while there was no severe anemia, this classification was compatible with a study done by (Mgongo, et al., 2018) but wasn't compatible with many studies as the study done in Iraq /Al-Samawa by (Hussain and Younis, 2019), Saudi Arabia by (Bardisi, 2015) Iran by (Mirzaie, et al., 2010), Ethiopia by (Anato, et al., 2017) and (Meleko, et al., 2017) where the highest classification of anemia was mild anemia.

In pregnancy, anemia is related to different socio-demographic and behavioral factors (Gedefawa, et al., 2015). In our study fifth (20%) of the anemic pregnant women were less than 18 years, only 20 % had high education and most of them (88%) were housewife that their husbands had governmental employee (75%). These results might be explained by the facts that higher education leads to better access of health information and better nutrition still, the study found no statistical association between anemia and any of the socio-demographic factors except that with occupation of the women ($p = 0.044$), which was unisonous to a study done in Iraq /Al samawa in 2018 (Hussain and Younis, 2019) and a study done in Yemen by (Wahdan, et al., 2017) where there was no association between anemia and age and to a study done in Turkey by (Pehlivan, et al., 2010) where there was no association between anemia and education.

Regarding obstetric history the highest percentage of the anemic pregnant women were multipara (74%) in the second trimester of pregnancy (47%) (those in the first trimester constituted 36% and in the third 17%) with less than two years inter-pregnancy interval (54%), received ANC care at public sector (53%) and had no history of bleeding (88%), abortion (80%), stillbirth (86%) or live birth (65%). There was statistical significant association between



anemia and all previous variables except the place of providing antenatal care ($p = 0.161$).

The result of first trimester anemia might explained by the possibility of existing of an early anemia before starting pregnancy while second trimester anemia might be due to expansion of plasma volume compared to red blood cell volume (hem remain same concentration) causing progressive hem dilution mostly during 30th–35th week of gestation lead to reduce hemoglobin concentration mainly in the second trimester of pregnancy and in turn increases the percentage of anemia in this trimester (Hussain and Younis, 2019). This came in line with a study done in Saudi Arabia where the highest percentage of anemia was in the 2nd trimester - (Bardisi, 2015) also the statistic association of anemia with multigravida and Inter pregnancy interval of less than two years in this study could be attributed to loss of iron and other nutrients as a result of repeated pregnancies (Alene and Dohe, 2014) and it was confirmed by other studies conducted in Iran by (Mirzaie, *et al.*, 2010) and in Turkey by (Pehlivan, *et al.*, 2010).

Study food habit of the anemic pregnant women in our study reveal that most of them (94%) eating animal source of food rich with iron at least once weekly but more than halve of them (58%) either daily or sometimes drinking tea after main meal a pattern reflecting unhealthy dietary habits because some food items are known to be rich in iron, but some others are chelator and might cause anemia like tea (Alene and Dohe, 2014). The study showed as well a significant association between anemia and food habit of the pregnant women (p value = 0.000) which is coincident with a study done in Baghdad by (Abd Alfatah, *et al.*, 2018 and in Egypt by (Sultan, *et al.*, 2019).



Regarding iron foliate supplement it is a routine measure to prevent anemia in pregnancy which is adopted in Iraq since many years (starting from the second trimester of pregnancy). Study the adherence of pregnant women to the intake of this supplement in the study sample revealed that about three quarter (71%) of the anemic pregnant women were either not taking the supplement or irregularly taking it and there was significant association between anemia and the intake of the supplement (P value = 0.004) which is the same findings found in a study done in Iraq /Baghdad 2016 (Abd Alfatah, *et al.*, 2018) and in Egypt by (Sultan, *et al.*, 2019).

Conclusion and Recommendation

high prevalence of anemia in this study and its association with factors related to unhealthy dietary habit, poor family planning and poor adherence to ferro-folate supplement intake is highly recommended that more effective educating programs about the importance of balanced diet and family planning have to be started in early reproductive life of women (preconception) and raise awareness about the importance of iron foliate supplement during pregnancy.

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Nil.

Conflict of Interests

The researcher declare that they have no conflicts of interest in relation to this study.



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