Prevalence and severity of anemia among pregnant women in primary health centers/Erbil City

Rushna Ghazi Abdulwahid
Surgical Specialty Hospital/Cardiac Center
Erbil DOH
Erbil Iraq
rushnamahamad@yahoo.com

Hamdia Mirkhan Ahmed
Head of Midwifery Department
College of Nursing
Hawler Medical University
hamdia.mirkhan@nur.hmu.edu.krd

Abstract: *Anemia in pregnancy is a major public health problem, especially in developing countries. Nutritional anemia is the most common type of anemia worldwide and mainly includes iron, folic acid, vitamin B12 and vitamin C deficiencies. Iron deficiency contributes to half of the burden of anemia globally. The objectives of this study were to find out the prevalence and severity of anemia among pregnant women. A descriptive study was conducted on 600 pregnant women, during the period October 2015 to November 2016 at four primary health care centers in Erbil city. Data gathered through interview with study sample and filling questionnaire format and reviewing their antenatal records. Blood hemoglobin level was measured to assess the severity of anemia. Chi-square test and regression were used to analyze the data. Prevalence of anemia was 46.2%, and 67.1% of the anemic women had mild anemia. There was a significant association of severity of anemia with wife education and occupation, smoking, the number of abortions and cesarean section, ante partum hemorrhage, taking tablets of iron and folic acid per month. The study concluded that prevalence of anemia considered high in Erbil city, the highest percentage had mild anemia.*

Keywords: Prevalence, anemia, pregnancy

INTRODUCTION

Anemia in pregnancy is a major public health problem, especially in developing countries. It affects 41.8% of pregnant women globally [1]. Anemia in pregnancy is defined by the World Health Organization (WHO) as a hemoglobin concentration below 11 g/dL [2,3]. According to WHO definition, the prevalence of anemia in pregnancy varies between 15% and 67% worldwide, with one of the highest (30-65%) in sub-Saharan countries, and the lowest (15- 25%) in developed countries. This rates seem too high even in high resource countries where under nutrition is almost absent [4].

Anemia during pregnancy is considered severe when hemoglobin concentration is less than 7.0 g/dL, moderate when hemoglobin falls between 7.0–9.9 g/dL and mild from 10.0-11 g/dL [5].

The cause of anemia in pregnancy is multi-factorial. Iron, folate, vitamin B_{12} and vitamin A deficiencies as well as intestinal parasitic infections, malaria, chronic illness have all been shown to be the main causes of anemia among pregnant women [1]. Nutritional anemia is the most common type of anemia worldwide and mainly includes iron, folic acid, vitamin B_{12} and vitamin

C deficiencies. Iron deficiency contributes for half of the burden of anemia globally. Iron deficiency affects 1.3 to 2.2 billion persons out of those 50% are women of reproductive age. In Ethiopia nearly 17% of women with age 15–49 are anemic of these 22% are pregnant women [6].

Anemia in pregnant women has severe consequences on health, social, and economic development. Anemic pregnant women will be at risk of low physical activity, increased maternal morbidity and mortality, especially those with severe anemia. In addition, both pregnant women and their neonates encounter negative consequence including fetal anemia, low birth weight (LBW), preterm delivery, intrauterine growth restriction and perinatal mortality [1]. Anemia in pregnancy is associated with adverse consequences both for the mother and the fetus. Studies have shown that the adverse consequences of maternal anemia may affect not only the neonate and infant but also increase the risk of non-communicable diseases when the child grows into an adult and the risk of low birth weight in the next generation [7]. Low maternal hemoglobin levels are associated with increased risk of preterm delivery, low birth weight babies, APGAR score <5 at 1 min and intrauterine fetal demise [8].

The study aimed to find out the prevalence and severity of anemia among pregnant women and its relationship with some demographic and obstetric variables.

METHODS AND MATERIALS

A cross- sectional study was conducted among pregnant women who attended antenatal care in primary health care centers (PHCCs) / Erbil city, during the period October/ 1st/ 2015 to November/ 13 / 2016. Four primary health care centers from totally 19, were randomly selected according to geographic area Brayati from north, Kurdistan from south, Malafande from east, and Mahamad bajalan from west. A purposive sampling of 600 pregnant women was included in the study. Sample size was estimated using the general formula for targeted population size, allowed error 5%, prevalence (ratio of the studied phenomenon in the population in similar study) and using the 95% confidence interval. The sample size of each primary health care center was according to their ratio in the targeted population. Mothers who had the following criteria were included: pregnant woman who were in 1st, 2nd,3rd trimester of pregnancy and those who accept to participate in the study. Woman's with history of chronic hypertension, diabetes, thyroid, cardiac diseases and systematic lupus

erythematosis, hemoglobinopathies such as thalassemia and those who hah early & late vaginal bleeding or ante partum hemorrhage (abruptio placenta and placenta previa) and hemorrhoid were excluded. Prior to data collection the official permission was obtained from College of Nursing, Erbil General Directorate of Health, and primary health care centers for carrying out the study in Erbil City. Face to face interview method and reviewing antenatal card was used for data collection and filling a designed questionnaire after taking permission & explanation the objectives of the study to the mother's. Blood hemoglobin level was measured to assess severity of anemia. Severity of anemia is determined according to Alene & Dohe as the 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)[5].

Approval of the Ethical Committee from the College of Nursing, in addition to approval of General directorate of primary health care center was secured, mothers consent verbally was taking to participate in the study. Data were entered into a computer using the Statistical Package for Science Services (SPSS version 23). Frequency, percentage and chi-square test was used for interpretation of data.

RESULTS

The highest percentage 57.3% of the study sample aged between 25-36 years old, while the lowest percentage 8% aged between 37-48 years old. Regarding residency, all participants of the study sample were living in urban area.

In the present study the prevalence of anemia during pregnancy was 46.2%, regarding severity of anemia the highest percentage 67.1% of the study sample had mild anemia, while the lowest percentage 32.9% of the study sample had moderate anemia, and there was no cases for severe anemia (Table1).

The results also indicated that there was a highly statistically significant association between severity of anemia with wife education & smoking (p < 0.001), and significant association with husband education and wife occupation, while there was no significant association with other variables (Table 2). A significant association between severities of anemia with number of SC was found in the present study, while there was no significant association between severity of anemia with other variables (Table 3). Table 4 shows that there was a significant association between severity of anemia with number of taking tabs/month of iron & folic acid, while there was no significant association between other obstetrical characteristics during current pregnancy.

Logistic regression analysis revealed that, lower professional job, taking <30 tabs of iron & folic acid per month, public clinic attending for antenatal care were indicated as risks for anemia. On the other hand, high professional job and birth spacing <2 years were

indicated no risks for anemia (p> 0.05 OR= 3.062, 1.433, 1.039, respectively)(Table 5).

Table 1- Prevalence and severity of anemia among study sample

Prevalence	F	%
Anemic	277	46.2
Non-anemic	323	53.8
Total	**600**	**100**
Severity of anemia		
Moderate	91	32.9
Mild	186	67.1
Total	**277**	**100**

DISCUSSION

WHO global database on anemia estimated the classification of anemia as a significance problem of public health if the prevalence of anemia be ≥40.0 [9]. The result of the present study shows the prevalence of anemia among pregnant women 46.2%. So according WHO classification it indicates as severe public problem. This results are similar to the results of other studies done in Bali, Indonesia in 2002 which was 46.2%, in northern Tanzania was 47.4% in 2011, and 48.2% in South-East Asia and 44.2% in Eastern Mediterranean by WHO 2005, in South Eastern Nigeria in 2007 was 40.4%, in Kakamega County, Kenya was 40% in 2014[3].

Prevalence of anemia during pregancy in the present study was higher than the results of other studies done in Wolayita Sodo Town, Southern Ethiopia in 2015 was 39.94%, in Makkah, Saudi Arabia was 39% in 2012, in Southeast Ethiopia was 27.9% in 2014, in Europe was 25.1% and in Americas 24.1% by WHO , in Nablus, Palestine was 21.7% in 2007, in Mekelle town was 19.7% in 2014, in the lower North Of Thailand was 17.5% in 2012, in Kerman, Iran was 4.7% in 2010. While the prevalence of anemia in the present study was lower than the results of other studies done in Korangi Industrial Area was 54.3% in 2010, inBaghdad was 55.4% in 2012, in an urban area of Eastern Ethiopia was 56.8% in 2014, in Africa was 57.1% by WHO , in eastern Sudan was 62.6% in 2005,in ruralpopulation of Kolar district of India was 64% in 2015, in a Malaria-Endemic Area in Benin was 68.3% in 2012, in an urban area of Pakistan was 90.5% in 2008 [3].

Regarding severity of anemia 67.1% had mild anemia and 32.9% had moderate anemia and there was no detecting for severe anemia in the present study. Kefiyalew et at, found that 55%, 32.5%, 12.5 of study sample had mild, moderate and severe anemia respectively, which was consistent to the results of the present study [10]. Dim & Onah reported 90.7% had mild anemia, 9.3% had moderate anemia and no cases of severe anemia was detected on their studies which was consistent to the results of the present study [2]. Gedefaw et al, found in their study that 30.34% of the

study sample had mild anemia, 60% had moderate anemia and 9.66% had severe anemia which was in contrast to results of the present study [1]. Naz & Begum found these rates regarding severity of anemia in their study: 23.18% mild anemia, 37.7% moderate anemia, 27.27% severe anemia and 11.8% very severe anemia which were in contrast to the results of the present study [11].

Table 2- Association of severity of anemia with socio-demographic characteristics (N= 277)

Variables	Moderate		Mild		P-value
	F	**%**	**F**	**%**	**Chi-square test**
Age group/years					
13-24	35	36.5	61	63.5	**0.315**
25-36	46	29.3	111	70.7	
37-48	10	41.7	14	58.3	
Wife Education					
Illiterate	20	54.1	17	45.9	
Read and write only	0	0.0	16	100.0	
Primary school	8	16.7	40	83.3	**< 0.001**
Intermediate school	15	39.5	23	60.5	
Secondary school	18	46.2	21	53.8	
Institute, college, and above	30	30.3	69	69.7	
Husband Education					
Illiterate	12	46.2	14	53.8	
Read and write only	2	66.7	1	33.3	
Primary school	10	17.2	48	82.8	**0.014**
Intermediate school	15	26.3	42	73.7	
Secondary school	12	33.3	24	66.7	
Institute, college, and above	40	41.2	57	58.8	
Wife Occupation					
High professional job	0	0.0	10	100.0	**0.035**
Lower professional job	12	26.1	34	73.9	
Unskilled workers	79	35.7	142	64.3	
Husband Occupation					
High professional job	2	14.3	12	85.7	**0.217**
Lower professional job	38	31.1	84	68.9	
Unskilled workers	51	36.2	90	63.8	
Economic status level					
Low economic status < 90	42	30.9	94	69.1	**0.676**
Middle economic status 90-120	29	36.7	50	63.3	
High economic status 121-150	20	32.3	42	67.7	
Smoking					
Passive	19	20.2	75	79.8	**0.001**
None	72	39.3	111	60.7	

Table 3- Association of severity of anemia with obstetrical history of the study sample (n= 277)

Variables	Moderate		Mild		P-value
	F	**%**	**F**	**%**	**Chi-square test**
Gravidity					
Primigravida	37	36.3	65	63.7	**0.559**
Multigravida	54	30.9	121	69.1	
Parity					
Nulliparous	44	31.9	94	68.1	
Primiparous	21	34.4	40	65.6	**0.890**
Multiparous	13	29.5	31	70.5	
Grand multipara	13	38.2	21	61.8	
Number of CS					
None	70	30.3	161	69.7	**0.032**
1-3	19	43.2	25	56.9	
4-6	2	100	0	0	
Birth spacing / Years n=185					
< 2	30	30.9	67	69.1	**0.066**
=> 2	37	42.0	51	58.0	

Table 4- Association of severity of anemia with current obstetrical characteristics of the study sample (N= 277)

Variables	Moderate		Mild		P-value Chi-square test
	F	%	F	%	
Trimester					
First trimester	5	50.0	5	50.0	**0.501**
Second trimester	51	32.3	107	67.7	
Third trimester	35	32.1	74	67.9	
Iron, folic acid, fero folic supplementation					
Yes	91	32.4	0	67.6	**0.612**
No	0	37.5	186	62.5	
Number of iron and folic acid tablet taking/month < 30					
≥ 30	82	29.5	171	70.5	**0.013**
None	9	57.7	15	42.3	
	67	37.5	160	62.5	
First visiting and registering in ANC units					
First trimester	15	32.4	11	67.6	**0.887**
Second trimester	9	33.2	15	66.8	
Third trimester	11	25.0	23	75.0	
Anemia before pregnancy					
Yes	78	55.6	157	44.4	**0.140**
No	2	32.1	6	67.9	
Hb level checking before pregnancy					
Yes	5	29.4	4	70.6	**0.290**
No	86	35.4	182	64.6	
Iron and folic acid supplementation before pregnancy					
Yes	35	37.5	84	62.5	**0.612**
No	56	32.4	102	67.6	
Frequency of ANC					
1-3	9	34.9	15	65.1	**0.107**
4-6	82	22.9	171	77.1	
Places of attending ANC					
Public clinic	21	29.2	51	70.8	**0.439**
Private & public clinic	70	34.1	135	65.9	

Table 5- Logistic regression analysis of the factors associated with anemia

Variables	P- value	Odd's Ratio	95% CI of OR
Wife Occupation			
High professional job	0.270	3.062	0.419 - 22.377
Lower professional job	0.041	0.543	0.302 –0.976
Unskilled workers (reference category)			
Birth spacing / Years			
< 2	0.118	1.433	0.913 – 2.249
≥ 2 (reference category)			
Number of iron and folic acid tablet taking/month			
< 30			
≥ 30 (reference category)	< 0.001	0.147	0.054 – 0.400
Places of attending ANC			
Public clinic			
Private & public clinic (reference category)	0.037	0.611	0.385 – 0.970

The results of the present study showed that there was a highly significant association of severity of anemia with wife education and smoking, these results agreed with results of Mirzaie *et al*, who found that there was a highly significant association of prevalence of anemia with maternal education and smoking [12]. Aikawa *et al*, mentioned that there was a highly significant association of Hb levels with maternal education which was consistent to the results of present study [13]. Khapre *et al*, results agreed with results of the present study regarding education which indicated that there was a significant relation of severity of anemia with maternal education [14].

There was no significant association of age group with severity of anemia in the present study, which was consistent to the results of Siteti *et al*, & Mirzaie *et al*, who found that there was no significant association of severity of anemia with maternal age [12,15].

A study done by Morsy & Alhady, who conducted descriptive study among 400 pregnant women to determine the prevalence of anemia and the influence of some factors associated with anemia during pregnancy in Egypt, they mentioned that maternal age has strongly associated with anemia level, which is disagreed with the results of present study [16].

Rajamouli *et al*, conducted a cross-sectional study on pregnant women, attending the maternity clinic of rural health training centre and teaching hospital of Chalmeda Anand Rao institute of medical sciences Karimnagar Telangana, India,to study the prevalence of anemia in rural pregnant women and the factors associated with anemia, they found that there was a significant association of severity of anemia with wife occupation which was consistent to the results of present study [17]. Studies of Khapre *et al*, also agreed with the present study regarding wife occupation who found that there was a significant association of severity of anemia with maternal occupation [14].

Soh *et al,* conducted a cross-sectional study in urban areas in Malaysia to determinethe Hb levels of antenatal mothers and their association with various socio-economic characteristics, they found that there was a high significant association between Hb level with economic status, which was in contrast to the results of present study, while it was agreed with that in which wife occupation have significant association with Hb levels and maternal occupation [18].

The present study show that there was no significant association of severity of anemia with iron, folic acid, fero folic supplementation in current pregnancy, which was in contrast to results of a study done by Mirzaie *et al*, and Aikawa *et al*, who mentioned that there was a significant association of Hb levels with iron supplementation [12,13]. While results of Lelissa *et al*, agreed with the results of present study regarding iron & folic acid supplementation, who mentioned that there was no significant association of severity of anemia with iron and folic acid supplementation [19].

Viveki *et al*, and Lelissa *et al*, mentioned on their results that there was no significant association of severity of anemia with trimester of pregnancy, which was consistent to the results of present study [20].

Regarding birth spacing <2 years in the present study there was no indicated for risks of anemia, which was in contrast to results of Abdelhafez and El-Soadaa who mentioned that women with short inter pregnancy periods were at more risk of developing anemia during pregnancy [21], while it was consistent to results of Abu-Hasira who found that decreased birth spacing didn't show such association [22].

Bekele *et al*, conducted a cross-sectional study to assess the prevalence and factors associated with anemia among pregnant women attending antenatal care in health institutions of Arba Minch town, Gamo Gofa zone, Southern Ethiopia, who mentioned that birth spacing was independent predictors of anemia in pregnancy, which was consistent to the results of present study [23].

CONCLUSION

The prevalence of anemia during pregnancy considered high in Erbil city, the majority had mild anemia. Wife occupation, number of iron tablet taking per month and place of attending for antenatal care were risk factors for anemia during pregnancy.

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