Anemia in Pregnant Women in Kirkuk Governorate

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Abstract:

Background: Anemia is defined as hemoglobin levels of ≤ 11 g/dl , is one of the world's leading causes of disability , and thus one of the most serious global public health problems .More than (50%) of the pregnant women in the world are anemic. Knowledge about the anemia is very important in our community. This knowledge will encourage those who work in primary health care (PHCS) provider for pregnant women to detect the problem earlier and treat the problem properly.

Aims: Is to determine the effective factors related to anemia in pregnant women in Kirkuk governorate.

Patient & Method: A total of 250 pregnant women were asked while attending antenatal unit in Azadi Teaching Hospital and several Primary Health Centers in Kirkuk City out patients clinic from 25.10. 2014 to1.3.2015. Data were taken involve: age, residency, educational level, history of last menstrual period, onset of anemia and level of hemoglobin (Hb). These data were organized in special questionnaire prepared for this purpose.

Results: From the total (250) pregnant women (61.6%) of them have low Hemoglobin (Hb) level mild, moderate or severe anemia the majority of them (75.33%) with mild anemia. according to severity the rate was (3.2%).

Conclusions and Recommendations: The prevalence of anemia among women in Kirkuk city during pregnancy is high (61.6%) in compare to (52%) in the world wide in developing countries.

Keywords: Anemia, Hemoglobin level, Pregnancy, Iraq, Kirkuk city.

Introduction:

"Iron deficiency anemia (IDA) is the most common nutritional deficiency in the world; estimates suggest that 2 billion persons worldwide have iron deficient" [1]. As aresult of the increased iron reqirmemt during pregnancy for mother and growth of baby are recognized it will be most susceptible groups to IDA. IDA during pregnancy has good relation on mother health and growth of baby [2]. IDA during pregnancy is associated with higher rates of premature labour and low birth weight [3, 4] Severe anemia during pregnancy increases the risk of reproduction-related mortality and mobidity at delivery and during the perinatal period [5]. IDA in infants may also impaire cognitive development and may have long-term consequences. [6, 7] Severe IDA in infants has been associated with delayed psychomotor development and developmental delays >10 y after the treatment of iron deficiency during infancy [8]. The total amount of iron requirements during pregnancy in a 55-kg women are ≈1040 mg [9]. Most of this iron is required

during the last trimester, at which time daily iron needs increase from before pregnancy requirements of equal 1–1.5 mg/d to ≤6 mg/d [5,9]. The amonts of the requirement is difficult to supplied from dietary sources alone, especially in developing country where the foods are often not rich in iron content and bioavailability is generally low or moderate because of high intakes of dietary fiber and phytates". [5, 9].

"Anemia in pregnancy is defined by the World Health Organization (WHO) as a hemoglobin concentration less 11 g/dl".[10] It continues to be a major health problem in many developing countries and is associated with increased rates of maternal and perinatal mortality, morbdity, premature delivery, low birth weight, and other adverse outcomes. [11, 12] More than half of the pregnant female in the world have low hemoglobin level[10] Although only 15% of pregnant female are anemic in developed countries,[13] .The prevalence of anemia in pregnant female in developing countries was relatively high (33% to 75%). [14, 16] The most common cause of anemia in pregnancy worldwide is IDA.[12] The most important predisposing factors for IDA include grandmultiparity, poverty, and impropre child spacing – among others". [17, 20]

Pathophysiology:

" The maternal blood volume in the last trimester is about (30%) more than in nonpregnant. This increase amount occurs mainly during the second and third trimesters of pregnancies. The reason behind this increased blood volume is likely due to increase hormone like aldosterone and estrogens, which are greatly increased in pregnancy and to increased volume of fluid reabsorption by the kidney. Also, the bone marrow will produce more red blood cells and become active during pregnancy and with the excess fluid volume retention blood volume will increase [21]. Also during pregnancy, hemoglobin concentration drops because the plasma volume expansion is relatively greater than the red cell mass increases. There are many causes for anemia during pregnancy but most commonly due to decrease hemoglobin production because of reduce amount of important precursors such as iron and folate. Less extent the causes of anemia during pregnancy, it might be due to hemolytic proses or chronic blood loss [22]."

During Pregnancy anemia can be seen as:

Iron-deficiency anemia (IDA): This type of anemia develops when iron losses or physiological requirements exceed absorption. In women of child-bearing age, menstrual blood loss, pregnancy and breastfeeding contribute to iron deficiency by depleting iron stores; in developed countries one-third of pre-menopausal women have low iron stores but only (3%) display iron-deficient haematopoiesis.IDA is the most common cause of anemia in pregnancy [25, 30]. "

The second type was Folate-deficiency anemia: Folate, also called folic acid. The human requires folic acid to produce new cells, including blood cells. During pregnancy, female requires more Folate. But sometimes the dietary intake doesn't meet the body requirement of folic acid. When that occurs, the end result is cells with arrested nuclear maturation but normal cytoplasmic development: so-called nucleocytoplasmic asynchrony. All

proliferating cells will exhibit megaloblastosis; hence changes are evident in the buccal mucosa, tongue, small intestine, cervix, vagina and uterus. The high proliferation rate of bone marrow results in striking changes in the haematopoietic system in megaloblastic anaemia. Folic acid deficiency can be responsible to special kind of congenital anomalies, such as neural tube defects (spina bifida) and intrauterine growth retardation ([25, 30].”

The third type was Vitamin B12 deficiency: The average daily diet contains 5-30 µg of vitamin B12, mainly in meat, fish, eggs and milk-well in excess of the 1 µg daily requirements. When a pregnant female doesn't eat enough vitamin B12 from her diet, her body can't produce enough healthy amount of RBC. ([25, 30].”

“The last two types are regarded as Megaloblastic anemia which characterized by the presence of special morphologic appearances and characteristics of the developing RBC in the bone marrow. The marrow is usually cellular with megaloblastiod maturation and the anemia is due to ineffective erythropoiesis [23].”

Patients and Methods:

This study was including 250 pregnant women attending ante-natal care units in Azadi teaching hospital & several PHCs in Kirkuk city between the periods November 1. 2014 and March 25. 2015.whom they have signs and symptoms of anemia.

Compete information’s were arranged in special questionnaire involve age, residency, educational level, history of last menstrual period, onset of anemia to gestation, severity of anemia, drug administration and blood transfusion during pregnancy, any associated diseases and previous history of anemia were obtained either by direct asking patients during their visit or by records kept by Hospital & PHCs.

Concentration of hemoglobin (gm/dl) was obtained from case sheets & patient report files at Azadi Teaching Hospital and PHCs. A hemoglobin value of less than 11.0 g/dL was considered anemia during pregnancy. The level of anemia were mild anemia (9.0–10.9 g/dL), moderate anemia (7.0–8.9 g/dL), and severe anemia (less than 7.0 g/dL).[10]

All the obtained Data were arranged in Microsoft excel program and analyzed statistically based on the variables into tables and charts like relationship of degree of anemia & age, residence, ANC, educational level, trimester which anemia began & multiple pregnancy. The source of variances among anemia and all the parameters were significant at $P < 0.05$.

Results:

Table (1) : number and percentage of deferent cases

From the examining a total of (250) pregnant women the all rate of anemia (61.6%) While the reminder (38.4%) have normal Hb level. Of those (61.6 %) have low Hemoglobin (Hb) level either mild (75.33%), moderate (19.48%) or severe anemia (5.19%). According to severity there is just (3.2%) of total cases have severe anemia.

Table (2): shows the degree of anemia among pregnancy in relation to their age (years)

This table summarizing the Relationship between types of anemia and patients age. It has been showen, that women aging from (25-34 years) have high rate of anemia (51.2%) follwed by (40%)

and (8.8%) in women there age ranged from (15-24 years) and above 34years respectively.

Table (3): shows the relationship between the degree of anemia and the trimester at which the anemia started.

Considering women gestation period and anemia frequencies; table 3 is showed obviously, that women in second trimester were highly susptable to anemia, the rate was (40.25%), followed by (37%) and (22.7%) respectively, severe anemia was not recorded in third trimester at the pregnancy versus to high rate (82%-85%) in first trimester regarding to moderate type of anemia the rate were higher (24.56%)and (8.77%) in third trimesters.

Table (4): shows the relationship between the degree of anemia and the ante natal care of the pregnant women.

The impact of irregular attendance to ANCs was clear on occurrence of anemia for general types, the rate was (24.8%) versus to (10 %)for regular women attendance, P <0.05. according to attendance in general for both (regular and irregular), women who have mild anemia reveal higher rate mild anemia (75.32%) compare to moderate and severe types of anemia P <0.05.

Table (5): Shows the degree of anemia among pregnancy according to their Residence in number and percentage

From the study of residence of the women who reported about (95.2%) of them live inside Kirkuk city (urban) and about (63%) of them have low Hb level. In the other side the reminder (4.8%) of pregnant women who reported live outside the city (rural) and about (66.6%) of them have normal Hb level.

Table (6): Shows educational level of women in relation to degree of anemia.

The relationship between women educational levels and the frequencies of anemia was significant P <0.05. This significancy was seen among women who have primary level of education the rate was (49.35%). Contrary to (12.98%) among women who are illiterate. Higher rate was recorded among women who have mild anemia in compare to moderate and severe anemia.

Table (7): shows the percentage of the pregnant women with multiple pregnancies according to the degree of anemia.

Among the all (250) pregnant women only (11) of them have multiple pregnancy and (54.5%) of women with more than one fetus have anemia, which is statistically not significant P >0.05

Table (1) : Number and percentage of deferent cases.

Cases	Number	Percentage
Cases with mild anemia	116	75.33
Cases with moderate anemia	30	19.48
Cases with severe anemia	8	5.19
Total anemic cases	154	61.6 %
Total normal cases	96	38.4%
Total cases	250	100%

Table (2): Shows the degree of anemia among pregnancy in relation to their age (years).

Age(year)	Mild		Moderate		Severe		Normal		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
A=(15-24)	56	56.0	8	8.0	5	5.0	31	31.0	100	40
B=(25-34)	51	39.85	20	15.63	2	1.56	55	42.96	128	51.2
C=(>34)	9	40.91	2	9.1	1	4.54	10	45.45	22	8.8
Total	116	75.33	30	19.48	8	5.19	96	38.4	250	100

X^2=10.77 DF=12 P.value=0.54872

Table (3): Shows the relationship between the degree of anemia and the trimester at which the anemia started.

Trimester at which anemia begins	Mild		Moderate		Severe		Total	%
	No.	%	No.	%	No.	%		
First	29	82.85	6	17.15	0	0.0	35	22.73
Second	49	79.04	10	16.13	3	4.83	62	40.25
Third	38	66.67	14	24.56	5	8.77	57	37.01
Total	116	61.6	30	19.48	8	5.18	154	100

X^2= 5.398 DF= 4 P value= 0.248842

Table (4): Shows the relationship between the degree of anemia and the ante natal care of the pregnant women.

Antenatal care (ANC)	Mild		Moderate		Severe		Total		Normal	
	No.	%	No.	%	No.	%	No	%	No	%
Regular	53	53.53	14	14.15	7	7.07	74	48	25	25.2
Irregular	63	41.72	16	10.59	1	0.67	80	51.9	71	47.0
Total	116	75.32	30	19.48	8	5.18	154	61.6	96	38.9

X^2=17.43 DF=3 P.value=0.000576

Table (5): Shows the degree of anemia among pregnancy according to their Residence in number and percentage

Residence	Mild		Moderate		Severe		Normal		Total
	No.	%	No.	%	No.	%	No.	%	
Urban	113	47.48	29	19.34	8	3.36	88	36.98	238
rural	3	25	1	8.34	0	0.0	8	66.66	12
Total	116	75.17	30	27.68	8	3.36	96		250

X^2=4.407 DF=3 p value = 0.220737

Table (6): shows the number and percentage of the degree of anemia among pregnant women and their Educational level.

Educational level	Mild		Moderate		Severe		Total	
	No.	%	No.	%	No.	%	No.	%
Illiterate	17	68.0	3	12.0	0	0.0	20	12.98
Primary	59	43.08	13	9.49	4	2.91	76	49.35
Secondary	16	40.0	9	22.5	4	10.0	29	18.83
Graduated	24	50.0	5	10.42	0	0.0	29	18.83
Total	116	71.8	30	21.79	8	5.63	154	100

X^2=20.767 DF=9 p value = 0.013726

Table (7): shows the percentage of the pregnant women with multiple pregnancies according to the degree of anemia.

Multiple pregnancy	Mild		Moderate		Severe		Normal		Total
	No.	%	No.	%	No.	%	No.	%	
Yes	5	45.45	0	0.0	1	9.1	5	45.45	11
No	111	46.45	30	12.55	7	2.92	91	38.08	239
Total	116		30		8		96		250

X^2=2.776 DF=3 p value = 0.427466

Discussion:

This cross sectional study was applied on 250 women of different ages, residency, period of gestations, levels of education, trimesters, patterns of antenatal care, and level of hemoglobin to know the prevalence of anemia in Kirkuk city.

The world health organization report anemia prevalence picture at global level at (52%) in the developing countries compared with (23%) in the developed countries [(10)].

The prevalence of anemia in pregnancy in this study was (61.6%) which is similar to the (37-56%) given by the WHO. Using the criterion of hemoglobin concentration <11g/dl to define anemia [(26, 27)].

The overall prevalence of mild anemia in the first trimester in this study was 11.6% while that of moderate one (2.4%) and no cases of severe anemia, on the other hand second trimester mild anemia was (19.6%),moderate (4%) and severe (1.2%) and in the third trimester mild anemia (15.2%), moderate (5.6%) and severe anemia (2%) result when compared with studies from Jordan, in the first trimester mild anemia (39.5%), moderate (7.2%) and severe anemia(0.3%) while in the second trimester mild anemia (44.4%), moderate (9.6%) and severe anemia (2.1%) and in the third trimester mild anemia (51.1%), moderate anemia 12.6% and severe anemia (3.2%)[(28,29)].

As a result, the percentage of anemia in Jordan is higher in all trimesters than our community. [(28)]

Conclusions:

The prevalence of anemia among women in Kirkuk city during pregnancy is high (61.6%) in compare to (52%) in the world wide in developing countries.

References:

[1].World Health Organization (WHO), Maternal Health and Safe Motherhood Division of Family Health. the prevalence of nutritional anemia in women. WHO.1991; Geneva.

[2]. Allen LH (2000) Anemia and iron deficiency: effects on pregnancy outcome. Am J Clin Nutr 71: 1280S–1284S.

[3]. Scholl TO, Reilly T (2000) Anemia, iron and pregnancy outcome. J Nutr 130: 443S–447S.

[4]. Garn SM, Ridella SA, Petzold AS, Falkner F, maternal hematologic levels and pregnancy outcomes. Semin Perinatal. 1981; 5:155-162.

[5]. Viteri FE the consequences of iron deficiency and anemia in pregnancy. Nutrient regulation during pregnancy, lactation and growth. Plenum Press, New York. 1994 ;86 :217–222.

[6]. Lozoff B, Wolf AW, Jimenez E, Iron-deficiency anemia and infant development: effects of extended oral iron therapy. J Pediatr, 1996: 129: 382–389.

[7]. Walter T Effect of iron-deficiency anemia on cognitive skills in infancy and childhood. Baillieres Clin Haematol, 1994, 7: 815-827.
[8]. Lozoff B, Jimenez E, Hagen J, Mollen E, Wolf AW (2000) Poorer behavioral and developmental outcome more than 10 years after treatment for iron deficiency in infancy. Pediatrics [serial online] 105: E51.
[9]. Bothwell TH Iron requirements in pregnancy and strategies to meet them. Am J Clin Nutr, 2000, 72: 257S–264S
[10]. World Health Organization (WHO) The prevalence of Anaemia in women: a tabulation of available information. Geneva, Switzerland: WHO; 1992. WHO/MCH/MSM/92.2.
[11]. Mahomed K. Iron and folate supplementation in pregnancy. Cochrane Database Syst Rev. 2000 ;(2) CD001135: World Health Organization Reproductive Health Library CD-ROM. 2004; 7.
[12]. Nyuke RB, Letsky EA. Etiology of anemia in pregnancy in South Malawi. Am J Clin Nutr. 2000; 72:247–256.
[13]. World Health Organization (WHO) Prevention and Management of Severe Anaemia in Pregnancy: Report of a Technical Working Group. Geneva, Switzerland: WHO; 1993. WHO/FNE/MSM/93.5.
[14]. Ogunbode O. Anaemia in Pregnancy. In: Okonofua F, Odunsi K, editors. Contemporary Obstetrics and Gynecology for Developing Countries. Benin City, Nigeria: Women's Health and Action Research Center; 2003; 514–529.
[15]. Ilobachie GC, Meniru GI. The increasing incidence of anemia in pregnancy in Nigeria. Orient J Med. 1990; 2:194–198.
[16]. Massawe SN, Urassa En, Nystrom L, Lindmark G. Effectiveness of primary level care in decreasing anemia at term in Tanzania. Acta Obstet Gynecol Scand. 1999; 78:573–579.[PubMed]
[17]. van den Broek NR, Rogerson SJ, Mhango CG, et al. Anaemia in pregnancy in southern Malawi: prevalence and risk factors. BJOG. 2000; 107:437–438.[PubMed]
[18]. Amadi AN, Onwere S, Kamanu CI, Njoku OO, Aluka C. Study on the association between maternal malaria infection and anemia. J Med Invest Pract (JOMIP) 2000;1:23–25.
[19]. Aluka C, Amadi AN, Kamanu CI, Feyi-Waboso PA. Anaemia in pregnancy in Abia State University Teaching Hospital Aba. J Med Invest Pract (JOMIP) 2001; 2:58–61.
[20]. Adinma JIB, Ikechebelu JI, Onyejimbe UN, Amilo G, Adinma E. Influence of antenatal care on the hematocrit value of pregnant Nigerian Igbo women. Trop J Obstet Gynaecol. 2002; 19:68–70.
[21]. Arthur C. Guyton, John E.Hall. Guyton and Hall of Medical Physiology. 11th Edition. Philadelphia, Pennsylvania. Elsevier Saunders; 2006; 1035.
[22]. Philip N. Baker (Eds). Obstetrics by ten teachers. 18th Edition. London: Euston Road; Medical diseases complicating pregnancy,2006;192.
[23]. Dan Longo, Anthony Fauci, Dennis Kasper, Stephen Hauser, J. Jameson, Joseph Loscalzo(Eds). Harrison's Principles of Internal Medicine, 18th ed. : McGraw Hill Professiona; 2011;862
[24]. Nicki R. Colledge,Brian R. Walker,Stuart H. Ralston(Eds).Davidson's Principles and Practice of Medicine, 21 ed. Edinburgh,london,new york,oxford,philadelphia,st louis,sydney,toronto : Elsevier limited; 2010;927.
[25].WEBMD. Health and pregnancy [Online]. 2005 [cited 2005]; Available from: http://www.webmd.com/baby/guide/anemia-in-pregnancy.
[26]. World Health organization. () The prevalence of anemia in women: Tabulation of available Information. WHO.1992; Geneva.
[27]. Demmouche A, Khelil S and Moulessehoul Anemia Among Pregnant Women in the Sidi Bel Abbes Region

(West Algeria) Journal of Blood Disorders & Transfusion , 2011;Volume 2 • Issue 3.
[28]. Mohammad A. Salahat and Abdallah I. Ibrahim. Prevalence of Anemia among Jordanian Pregnant Women and the Effect of Early Pregnancy on Alkaline Phosphatase Activity. Jordan Journal of Biological Sciences. Volume 5, Number 1, March 2012; 65 – 70.
[29]. Hassan Y. Hassan ,Abdulhadi M.Juma,Fadheelaha S.Azeez, Prevalence of Anemia during pregnancy in Kirkuk province, Kirkuk medical journal (KMJ):vol.6,no.1,2018: 66.
[30]. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston ;Davidson's Principles and Practice of Medicine ,chapter 5 , blood disease, Elsevier Limited , 23rd edition , 2018; 1010-1020.