SUJMS
Sana'a University Journal of Medical Sciences

Original Article

Prevalence of anemia in pregnant Yemeni women in sana'a city

Dr Fadl Al-Wousabi[1], Dr Hafiz Al-Nood[2], Dr Sosun Al-Ra'awy[3]

1 Associate professor, Department of Obstetrics & Gynecology, Faculty of Medicine and Health Sciences, Sana'a University, Sana'a, Yemen

2 Associate professor, Department of Hematology, Faculty of Medicine and Health Sciences, Sana'a University, Sana'a, Yemen

3 Director of Laboratory Department, Al-Sabain Hospital, Sana'a, Yemen.

Abstract

The aim of this study was initially to asses the prevalence of anemia in Yemeni pregnant women. CBC was done on 100 pregnant women attending Al-Sabain Hospital and Cloudy Fain Heath center in Sana'a city.
High prevalence of anemia (39%) was found among them. All the anemic cases showed microcytic, hypochromic red cells suggesting iron deficiency is the likely most common cause. Anemia was significantly higher in the third trimester of pregnancy, older age, grand multi gravida and in those with lower iron and folate supplement intake than non-anemic pregnant women. It is highly recommended for iron and folate supplement intake during pregnancy. This study should be extended to include larger sample size with serum ferritin and hemoglobinpathies investigations..

Introduction:

Anemia is defined as decreased hemoglobin level or circulating red blood cells and it is the most common hematological disorder during pregnancy particularly in developing countries.

During pregnancy, blood plasma volume increases by about 45% and the red cell mass rises by about 25% above normal by the end of gestation this still causes a fall in hemoglobin (Hb) concentration. Anemia continues to be a major health problem in many developing countries and is associated with increased rates of maternal and prenatal mortality, pre-term delivery, small for gestational age(SGA), lowbirth weight, sepsis and other adverse outcomes(1,2).

Upto 900 mg iron is needed for the rise in red cell mass and for the fetus. Despite an increase in iron absorption, few pregnant women get away from fall in iron stores by the end of pregnancy. The mean corpuscular volume (MCV) rises by about 4 fL in pregnancy which its decrease is the first sign of iron deficiency that is followed by decrease in mean corpuscular hemoglobin (MCH) and finally anemia appears. Serum ferritin less than 15 ug/L with serum iron lower than 10 umol/L is indication for early iron deficiency in pregnancy.

Also in pregnancy, folate requirements are raised about twice since serum folate level falls to about half the normal concentrations with a less decrease in red cell folate. Megaloblastic anemia is common during pregnancy in some region of the world due to combination of increase folate requirements and poor diet. Both iron and folate intake usually should be increased during pregnancy to avoid iron and folate deficiency anemia particularly during the third trimester.

More than half of the pregnant women in the world have hemoglobin levels indicative of anemia(3). Although only 15%of pregnant women are anemic in developed countries(4). The World Health Organization (WHO) estimates that 58% of pregnant women in developing

***Corresponding Author:** *Fadl Mansour Al Wousab Assistant Professor of Obstetrics & Gynecology*

countries are anemic mainly due to iron and folate deficiencies (5). Because there was no published data on anemia in Yemeni pregnant women, this pilot study was conducted first, to determine the prevalence of anemia and its types in pregnant women attending some maternal health centers in Sana'a city; and secondly, to clarify its association with some biological factors.

Material and Methods

In this descriptive cross-sectional study, a blood samples (in EDTA) were collected from 100 Yemeni pregnant women, attending the out-patient clinic of the obstetric department at Al-Sabain Hospital and Cloudy Fain Health Center for antenatal care between April and May 2010. The sample was analyzed in the same day for complete blood count (CBC) using the hematological analyzer MYTHIC 22 (Orphee, Geneva, Switzerland). Blood samples that showed Hb < 11g/dL were considered as anemic and for mild, moderate and severe anemia were Hb concentration of > 10 – 10.9 g/dL, 7 – 10 g/dL and < 7 g/dL, respectively, according to WHO criteria (6), MCV < 79 fL as microcytic, MCV > 100 fL as macrocytic and MCH < 27 pg as hypochromic red cell.

Data regarding to their age, gravida, last inter-pregnancy interval, trimester of pregnancy, iron and folate supplements intake collected from questionnaires that were interview administrated for each pregnant women during their attendance at the Al-Sabain Hospital and CFHC.

Statistical Analysis

Results were expressed as mean ±SD. Differences in variables between anemic and non-anemic pregnant women were done using the independent-sample t-test and chi square as appropriate. A P value of <0.05 was considered as significant.

Results

A total of 100 Yemeni pregnant women were enrolled in this study (aged 17 – 45 years). Thirty nine (39%) of them were anemic (mean Hb 9.8 ±1.18 g/dL). Mild, moderate and severe anemia was found in 23 (23%), 14 (14%) and 2 (2%) of all the cases, respectively. All the anemic samples showed microcytic, hypochromic red cells. None of the samples showed macrocytic red cells. The means of Hb concentration, packed cell volume (PCV), red cell count, MCV, MCH and red blood cell distribution width (RDW) in the anemic were statistically significant (P < 0.05) lower than in non-anemic pregnant women (table 1).

Table 1. Hematological values of anemic and non-anemic pregnant women (n=100)

Parameters	**Anemic (n=39)**		**Non-anemic (n=61)**		
	Mean	SD	Mean	SD	***P* <0.05**
Hb (g/dL)	9.8	1.18	12.7	1.0	**0.000***
PCV (%)	30.4	3.7	38.3	2.9	**0.0001***
RBC ($x10^{12}$/L)	4.2	0.2	4.4	0.3	**0.0004***
MCV (fL)	72.1	6.0	85.4	15.9	**0.0001***
MCH (pg)	23.5	2.6	28.2	3.9	**0.0001***
RDW (%)	16.3	2.4	14.8	2.1	**0.0014***

*Indicates significant results

Table 2 shows the distribution of trimester of pregnancy in anemic and non-anemic pregnant women. About half of the anemic pregnant women (48%) were in the third trimester while about half of the non-anemic (49%) were in the first trimester.

Table 2. Distribution of non-anemic and anemic pregnant women by trimester

	FIRST TRIMESTER		SECOND TRIMESTER		THIRD TRIMESTER	
	No.	%	No.	%	No.	%
Non-anemic	29	48	16	26	16	26
Anemic	11	28	9	23	19	49

Table 3 shows significant (P <0.05) differences by mean age, trimester and gravida, and non-significant difference by mean last inter-

pregnancy interval were found between anemic and non-anemic pregnant women.

Table 3. Distribution of biological data in anemic and non-anemic pregnant women

	Anemic (n=39)		Non-anemic(n=61)		
	Mean ±SD	Range	Mean ±SD	Range	*P* <0.05
Age (years)	27 ±6.4	17 – 45	24 ±4.5	17 - 35	0.0071*
Trimester	2.2 ±0.8	1 – 3	1.7 ±0.8	1 - 3	0.003*
Gravida	5.0 ±3.7	0 – 18	2.2 ±1.9	0 - 9	0.0001*
Last inter-pregnancy interval (months)	20.5 ±14.9	0 – 60	19.7 ±25.4	0 - 60	0.859

**Indicates significant results*

Table 4,shows that iron supplements intake was significantly (P < 0.05) higher in non-anemic (75%) than anemic pregnant women (41%) while folate supplement intake was insignificantly (P > 0.05) higher in non-anemic (85%) than anemic pregnant women (64%). In both anemic and non-anemic subjects the folate intake was higher than iron intake. Regular and irregular taker of iron and/or folate was considered in the study as iron and/or folate intake due to imprecise estimation of pregnant women's intake.

Table 4. Percentage of iron and folate supplement in anemic and non-anemic pregnant women

	Anemic (n=39)		**Non-anemic (n=61)**		
State	No.	%	No.	%	*P*<0.05
Iron Intake	16	41	46	75	0.0076*
Folate Intake	25	64	52	85	0.1114

**Indicates significant results*

Discussion

This study represents the first attempt to evaluate the prevalence of the anemia among Yemeni pregnant women. Despite the small sample size, it reveals that the prevalence of anemia is high (39 %) in pregnant women who attending Al-Sabain Hospital and CFHC. This high rate of prevalence reflects the nutritional health predominantly problem among Yemeni pregnant women and close to finding in the Eastern region of Saudi Arabia (41.3%) (7), Kuwait (36.8%) (8), Oman (43.6%) (9), Bahrain (49.6%) (10), rural Vietnam (43.2) (11), Mali (47%) (12), Malaysia (34.6%) (13), but higher than the prevalence of anemia among pregnant women in USA (22%) (14) and Belgium (31%) (15) which reflects a poorer nutritional health state in pregnant women in developing than developed countries.

All the anemic subjects showed microcytic hypochromic red cells which is consistent with Asnafi et al (2000) study (16) suggesting iron deficiency which is the major cause of anemia during pregnancy which needs to be confirmed by serum ferritin and other hemoglobinopathies investigation to exclude other causes of microcytic hypochromic anemia, since the prevalence of thalassemia trait in Yemen is 13.3% (17). Absence of macrocytic anemia in the pregnant women could be due to the small sample size or high number of women's folate intake supplement during pregnancy found in this study. The severity of anemia among Yemeni pregnant women reported in this study (2%) is consistent with Rasheed et al (2008) finding (7).

The prevalence of anemia in the older than younger pregnant women found in the present study is agreed with finding in Mahfouz et al study (1995 (18). The association of anemia with higher gravida is consistent with Mahfouz et al (1994) (19) and Afifi (2003) (9) studies and unlike their finding regarding to last inter-pregnancy interval that reported in this study.Increased rate of anemia with advanced gestational age found in our study is similar to the findings of Suega et al (2002) (20), Mahfouz et al (1994) (19) and Massot et al (2003) (15) studies. Lower percentage of iron supplement intake among anemic pregnant women in this study than non-anemic is agreed with Zhou et al (2005) (21) study.

In conclusion, this initial study shows that a substantial high prevalence of anemia is present within the Yemeni pregnant women. Microcytic hypochromic anemia was the predominant type suggesting iron deficiency is likely the most common cause. Health education program at the maternal health center should emphasize on iron

supplement with adequate intake of iron rich diet during pregnancy. This pilot study should be extended to include larger sample size with serum ferritin and hemoglobinpathies investigations for accurate diagnosis of anemia during pregnancy.

Acknowledgment

The auther is grateful to the research group students: Monsor Al-Kobati, Abdultif Siad, Said Kasem, Sliman Dali, Amar Grhoom, Maged Dahloos, Abdulrahman Al-Montaser, Abdulh Al-Nemiry and Ali Aglan for their efforts in the samples collection and analysis. Thanks are to the staff of the Coldy Fain Health Center for their cooperation in sample collection.

References:

1. Mahomed K. Iron and folate supplementation in pregnancy. Cochrane Daatabase Syst Rev.2000;(2) CD001135: World Health Organization Reproductive Health Library CD-ROM. 2004;7.

2. Nyuke RB, Letsky EA. Etiology of anemia in pregnancy in South Malawi. Am J Clin Nutr. 2000;72:247-256

3. World Health Organization (WHO) The prevelance of Amemia in women: a tabulation of available information. Geneva, Switzerland: WHO; 1992. WHO/MCH/MSM/92.2.

4.World Health Ogganization (WHO) Prevention and Management of Server Anemia in Pregnancy: Repot of a Technical Working Group.Geneva, Switzerland: WHO; 1993. WHO/FNE/MSM/93.5

5. Galloway R, Dusch E, Elder L, Achadi E, Grajeda R, Hurtado E, et.al. Women's perceptions of iron deficiency and anemia prevention and control in eight developing countries. Soc Sci Med 2002 Aug;55(4):529-44

6. DeMaeyer EM, Dallman P, Gurney JM, Hallberg L, Sood SK, Srikantia SK. Preventing and Controlling Iron Deficiency Anemia through Primary Health Care: A Guide for health administrators and programme managers 1989; WHO: Geneva, Switerland.

7. Rasheed P, Koura RM, Al-Dabal BK, Makki MS. Anemia in pregnancy: A study among attendances of primary health care centers. Ann Saudi Med 2008; 28(6): 449 - 452.

8. Dawood JS, Prakash P, Shubber KM. Iron deficiency among pregnant Arab women. J Kuwait Med Assoc 1990; 24: 167-72.

9. Afifi M. Anemia in pregnancy at South Sharqqiya health centers, Oman. J Egypt Public Health Assoc 2003; 78: 39-54.

10. Amine EK. Bahrain Nutrition Status Survey. UNICE F Gulf Area Office, Abu Dhabi, United Arab Emirates 1980.

11.Aikawa R, Ngyen CK, Sasaki S, Binns CW. Risk factors for iron-deficiency anemia among pregnant women living in rural Vietnam. Public Health Nutr 2006; 9: 443-8.

12.Ayoya MA, Spiekermann-Brouwer GM, Traore AK, Stoltzfus RJ, Garza C. Determinants of anemia among pregnant women in Mali. Food Nutr Bull 2006; 27: 3-11.

13. Hassan R, Abdullah WZ, Nik Hussain NH. Anemmia and iron status of Malay women attending an antenatal clinic in Kubang Kerian, Kelantan, Mallaysia. Southeast Asian Trop Med Public Health 2005; 36: 1304-7.

14. Alper BS, Kimber R, Reddy AK. Using ferritin levels to determine iron deficiency anemia in pregnancy. J Fam Pract 2000; 49: 829-32.

15. Massot C, Vanderpas J. A survey of iron deficiency anemia during pregnancy in Belgium: analysis of routine hospital laboratory data in Mons. Acta Clin Belg 2003; 58: 169-77.

16. Asnafi N, Sina S, Miri SM. Prevalence of anemia and its relationship with mother's age and gestational age in pregnant women visiting Yahyanejad hospital of Babol in 2000 J Reprod Infertil. 2003; 4(3):213-9.

17. Al-Nood H. Thalassemia Trait in Outpatient Clinics of Sana'a City, Yemen. Hemoglobin 2009,33(3-4):242 – 246.

18. Mahfouz AA, el-Said MM, al-Erian RA, Hamid AM. Teenage pregnancy: are teenagers a high risk group? Eur J Gynecol Reprod Biol 1995; 59:17-20.

19. Mahfouz AA, El-Said MM, Alakija W, Badawi IA, Al-Erian RA, Moneim MA. Anemia among pregnant women in the Asir region, Saudi Arabia: an epidemiological study. Southeast Asian J Trop Med Public Health 1994;25:84-7.

20. Suega K, Dharmayuda TG, Sutarga IM, Bakta IM. Iron-deficiency anemia in pregnant women in Bali, Indonesia: a profile of risk factors and epidemiology. Southeast Asian J Trop Med Public Health 2002; 33: 604-7.

21. Zhou SJ, Schilling MJ, Makrides M. Evaluation of an iron specific check list for the assessment of dietary iron in pregnant and postpartum women. Nutrition 2005; 21: 908-13.