

## Estimation of the Prevalence of Anemia and Dietary Pattern

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## Abstract

**Background:**

Anemia is a global public health problem affecting both developed & developing countries during pregnancy & has an adverse effect on both mother & fetus.

**Objectives:** Estimation of the prevalence of anemia and dietary pattern during pregnancy in Ramadi health center & Hit health center during the period between January –April , 2013

**Method:** A cross sectional study was carried out in Ramadi (AL-Till health center) & Hit (Hit health center) during the period between January–April , 2013. Hundred in AL- Ramadi & Hit of available pregnant females in 3<sup>rd</sup> trimester in both centers were interviewed.

**Results;** The study revealed that quarter of the pregnant females were below age of 18 years & reached 30% above 30 years especially in Hit health center. About half of the females were anemic in Ramadi center, 45% had mild anemia (mean hemoglobin  $9.8 \pm 0.8$ ), mean HCT  $31.8\% \pm 0.8$ .

7% had moderate anemia (mean hemoglobin  $8.2 \pm 0.6$ ), HCT  $27.3\% \pm 0.5$  while the prevalence of anemia increased to 62% in Hit center, 29% had mild anemia (mean  $9.5 \pm 0.5$ , HCT  $31\% \pm 0.3$ .

27% had moderate anemia (mean  $7.6 \pm 1.06$ ), HCT  $27.2\% \pm 0.5$  but 6% were with severe anemia (mean SD  $6.3 \pm 0.4$ ), HCT  $24\% \pm 0.6$ , with statistically difference,  $PV=0.001$ . Less than half of the respondents had normal weight gain (8-12kg) & 70% without spacing between last deliveries with multiparty in both centers. More than half of anemic females drank tea > twice/day directly after meal with significant association especially in Ramadi center. There were no educational sessions about healthy diet, family planning, proper habits in both centers. Quarter of pregnant women had good intake of red meat in both centers and another had average intake in both centers, less than half of respondents had average intake of poultry in Ramadi center but less intake in Hit center, there was poor intake of fish in Ramadi center but improved in Hit center, there was poor intake of liver of in both centers with inverse association between anemia & meat group intake. Less than half of the respondents had milk daily & weekly in both centers; the same picture was found with eggs. All of them had cooked rice with oil, white bread daily, potato & macaroni weekly & legumes monthly in both centers. All of them had good intake of tomato & cucumber in both centers, less than half of them had average intake of green pepper, green leaves & lettuce but all of them had poor intake of spinach, carrot, chard, beet in both centers. Less than half had average intake of orange, apple & dates, granite in Ramadi center: the same picture for apple but improved for dates & granite to 20% as good & 60% as average intake in Hit center, less for intake of banana that 20% had average intake, while for raisins didn't take it in both centers.

**Conclusion:** It is concluded that more than half of pregnant women were anemic, with multiparty because of lack of spacing between deliveries. All of them didn't receive any educational sessions that need guidance in selecting of nutrient dense foods & removing of bad nutritional habit of drinking tea with or directly after meals in both centers.

**Recommendations:** Continuous nutrition education and monitoring programs with proper nutrition counselling should be developed at all levels according to the recommendations to anemia. Community-based participatory women's group interventions have been found to be particularly effective in implementing behavior change amongst mothers with positive effects on newborn birth outcomes.

**Key Word:** "anemia, "3<sup>rd</sup> trimester pregnancy, "dietary pattern.

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## Introduction:

Anemia in pregnancy is an important public health problem worldwide. WHO estimates that more than half of pregnant women in the World have a hemoglobin level indicative of anemia ( $< 11.0\text{g/dl}$ ), the prevalence may however be as high as 56 or 61% in developing countries<sup>[1]</sup>, in these countries, the cause of anemia during pregnancy is multifactorial and includes nutritional deficiencies of iron, folate, and vitamin B12 and also parasitic diseases, such as malaria and hookworm. The relative contribution of each of these factors to anemia during pregnancy varies greatly by geographical location, season, and dietary practice. In Sub-Saharan Africa, iron and folate deficiencies are the most common causes of anemia in pregnant women<sup>[2]</sup>. Anemia has a variety of converging contributing factors including nutritional, genetic, and infectious disease factors; however, iron deficiency is the cause of 75% of anemia cases<sup>[3]</sup>. Prevalence of anemia can be as high as 61% in developing countries<sup>[1]</sup> while the prevalence during pregnancy differed from 18% in developed countries to 75% in South Asia<sup>[4]</sup>, with a high incidence and severity occurring among primigravida living in malaria endemic areas<sup>[5]</sup>. In pregnancy, anemia has a significant impact on the health of the fetus as well as that of the mother. 20% of maternal deaths in Africa have been attributed to anemia<sup>[6]</sup>. Women often become anemic during pregnancy because the demand for iron and other vitamins is increased due to physiological burden of pregnancy. The inability to meet the required level for these substances either as a result of dietary deficiencies or infection give rise to anemia<sup>[3]</sup>.

Anemia ranges from mild, moderate to severe and the WHO pegs the hemoglobin level for each of these types of anemia in pregnancy at  $10.0 - 10.9\text{g/dl}$  (mild anemia)  $7 - 9.9\text{g/dl}$  (moderate anemia) and  $< 7\text{g/dl}$  (severe anemia)<sup>[7]</sup>.

During pregnancy should have educational sessions about healthy diet, proper hygiene, important of breast feeding, family planning, proper habits as decrease drinking of tea & coffee, stop smoking. During pregnancy needs to give 300 k.cal as extra energy &  $1.4\text{g/kg}$  of protein with 50% increase of vegetables & fruit & intake of 6-8 cups of water with 4 cups of milk<sup>[8]</sup>.

Fetuses are at risk of preterm deliveries, low birth weights, morbidity and perinatal mortality due to the impairment of oxygen delivery to placenta and fetus<sup>[6]</sup>. Besides poor nutrition, frequent labor, multiparity, abortions, parasitic infections, consuming excess tea or coffee after meals determined as the predictors of anemia in reproductive age women<sup>[9]</sup>.

**Objectives;** Estimation of prevalence of anemia & dietary pattern during Pregnancy in Ramadi & Hit Cities in Iraq 2013.

**Methodology;** A cross-sectional convenient study was carried out in AL-Till Ramdi health center & Hit health center that (200) available pregnant females in 3rd trimester were interviewed during the period between January – April, 2013.

**Study design:** A Cross sectional descriptive study had been carried out in AL- Till Ramdi health center & Hit health center.

### Population & Sample size :

An interview questionnaire had used for the pregnant females in 3<sup>rd</sup> trimester mentioned above during the period of the study .The interview continued consequently till reached the sample size (convenience non probability sampling).

The sample size had been estimated according to the prevalence of anemia during Pregnancy which is 37.9% in Iraq ) [7] with using confidence interval at level of 95% .

The equation of the sample size is;  $N = (1.96) \times P(1-P)$  [10]

(0.05)<sup>2</sup> The sample size of pregnant females should be 184 & could be reached to 200.

An interview questionnaire form had been designed by the researcher was based on:

1. Demographic & social characteristics that include age, education, marital and job status.
2. Obstetrical history as: gravidity, parity, abortion.
3. Spacing between deliveries that asked the respondents about the period between the last baby & the child before.
4. Habits as; tea drinking & smoking cigarette.
5. Dietary pattern was rated according to food groups using frequency distribution table as the following:

Dividing the food items according to their groups which were available for season as meat group which contained red meat, poultry & liver. Milk group contained milk, cheese & yogurt then eggs. Part of legume group was taken as lentils & fava bean then seed group contained rice, white & brown bread, macaroni, potato.

For vegetable group tomato, cucumber, green pepper, green leaves as spinach, carrot, chard, beet, lettuce, squash, cabbage were chosen while for fruit group as orange, apple, banana, dates, pear, granite, raisins were chosen which were rich in nutrients.

Considering a good dietary pattern or daily intake when there was more than 4 times/week intake of food item, an average dietary pattern or weekly intake when there was 2-3 times/week intake of food item while considered poor dietary pattern or monthly when intake of food item was less than 2 time / week. [8]

7. Educational sessions about healthy diet, family planning, decrease drinking of tea & coffee, stop smoking.  
\* **Statistical Applications:** Statistical tests were applied as frequencies, rates, X<sup>2</sup> Test with calculating of confidence Interval at 95% confidence level, considered P value < 0.05 statistically significant.

**Tests:** hemoglobin concentration was measured by Drabkin method, Hematocrit was measured by manual reading of capillary tubes after centrifuging.

- Guidelines for diagnosing of anemia were considered as in the first and third trimesters, Hematocrit (HCT) less than 33 % & Hemoglobin level less than 11 g /dL of blood suggest anemia. In the second trimester, the levels are a little lower: 32 percent HCT & 10.5 g/dL Hemoglobin. [11]

#### Results :

**Table (1):** Age distribution of the sample showed that 25% ,20% were below age of 18 years in Ramadi center & Hit center respectively & there were 15%, 30% over thirty in both centers respectively .

Table 1; Distribution of pregnant women according to age in Ramadi &amp; Hit Health Centers

Age	Ramadi city		Hit city	
<18 years	25	25%	20	20%
18-30 years	60	60%	50	50%
>30 years	15	15%	30	30%
Total	100	100%	100	100%

- 30% were primigravida & others were multi & grant multigravida

**Table (2):** Prevalence of anemia among pregnant women showed that 52% were anemic in Ramadi center, 45% had mild anemia (mean hemoglobin  $9.8 \pm 0.8$ ), mean HCT  $30.4\% \pm 0.8.7\%$  had moderate anemia (mean hemoglobin  $8.2 \pm 0.6$ ), HCT  $28.2\% \pm 0.5$

while the prevalence of anemia increased to 62% in Hit center, 29% had mild anemia (mean  $9.5 \pm 0.5$ , HCT  $30\% \pm 0.5$ . 27% had moderate anemia (mean  $7.6 \pm 1.06$ ), HCT  $27.2\% \pm 0.5$  but 6% were with severe anemia (mean SD  $6.3 \pm 0.4$ ), HCT  $24\% \pm 0.6$ , with statistically difference,  $PV=0.001$ .

Table 2: Distribution of pregnant women according to Hemoglobin level in Ramadi &amp; Hit Health Centers

Hemoglobin level	Ramadi		Hit	
> 11g	48	48%	38	38%
9-10.9 g	45	45%	29	29%
7- 8.9 g	7	7%	27	27%
< 7 g	-----	-----	6	6%
Total	100	100%	100	100%

$X^2 = 14.84$ ,  $df = 2$   $P$  Value = 0.001

**Table (3):** Association between anemia & intake of meat group showed that there was inverse association between anemia & intake of meat group, ( $P$  value = 0.001).

**Table 3; Association between anemia & intake of meat group in Ramadi &Hit Health Centers**

Meat group intake	Anemia	No anemia	Total	%
Good	4	5	9	11%
Average	5	10	15	17%
Poor	45	16	61	72%
Total	54	31	85	100%

 $X^2 = 14.48$ ,  $df = 2$   $P$  Value = 0.001

**Table (4):** Distribution of pregnant women according to weight gain showed that only 45%, 40% with normal weight gain (8–12kg) in both centers respectively,

25% had weight gain for less than 8 kg in Ramadi center compared to 35% in Hit center. On the other hand 30% had weight gain for more than 12kg in Ramadi center compared to 25% in Hit center.

**Table 4; Distribution of pregnant women according to weight gain in Ramadi &Hit Health**

Weight increasing	Ramadi		Hit	
< 8 kg	25	25%	35	35%
8 – 12 kg	45	45%	40	40%
> 12 kg	30	30%	25	25%
Total	100	100%	100	100%

**Table (5):** Association between anemia & intake of tea showed that all anemic pregnant females had tea every day directly after meal in both centers that 61.54% of anemic females had taken tea > twice /day in Ramadi center & 35.48% in Hit center with

Table 5: Association between anemia &amp; intake of tea in Ramadi &amp; Hit Health Centers

Drinking tea	Anemia In Ramadi		Anemia In Hit		Total
	No.	%	No.	%	No.
1 time	10	19.23%	20	32.26%	30
2 times	10	19.23%	20	32.26%	30
> 2 times	32	61.54%	22	35.48	54
Total	52	100%	62	100%	114

$X^2 = 7.2$ ,  $df = 2$ ,  $P \text{ Value} = 0.05$

- There were no educational sessions about healthy diet, family planning, proper habits in both centers.

**Figure (1):** Dietary pattern of meat group showed that 25%, 20% had good & average intake of red meat respectively in both centers. 40%, 30% had average intake of poultry in both centers respectively.

20% had average intake of fish in Ramadi center & increased to 40% in Hit center. 100% had poor intake of liver & other meat organs in both centers.

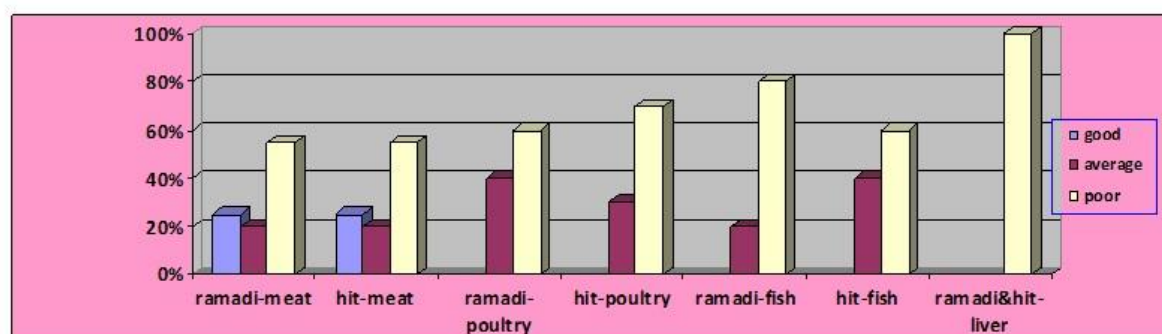


Figure1: Dietary pattern of meat group in Ramadi &amp; Hit health Centers

**Figure (2):** Dietary pattern of milk group showed that 20% had good & other 20% had average intake of milk in both centers. For cheese half of them had intake it in Ramadi center as good & average intake & improved in Hit center to 30% had good & 30% had average intake with better intake of yogurt in both centers.



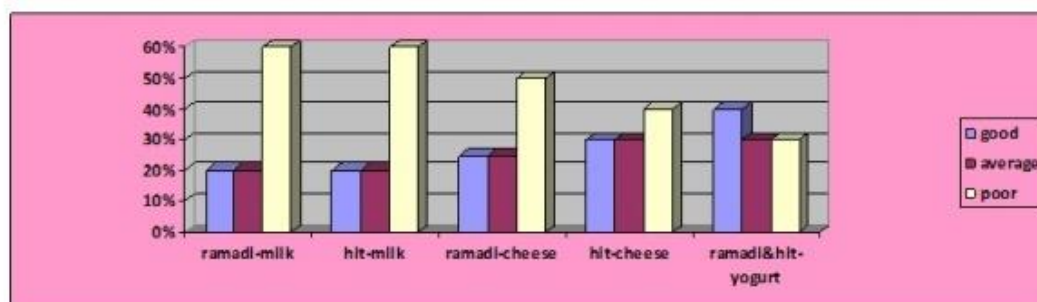


Figure 2: dietary pattern of milk group in Ramadi & Hit health Centers

- The same picture was found with eggs as 20% had good & other 20% had average intake in both centers.
- All of them had intake of rice & white bread daily, potato & macaroni weekly & legumes monthly in both centers.

**Figure (3):** Dietary pattern of vegetables showed that 70%, 60% had average intake of tomato & cucumber in both centers respectively, less for green pepper, green leaves & lettuce that 40% had average & 60% had poor intake of these vegetables respectively but all of them had poor intake of spinach, carrot, chard, and beet.

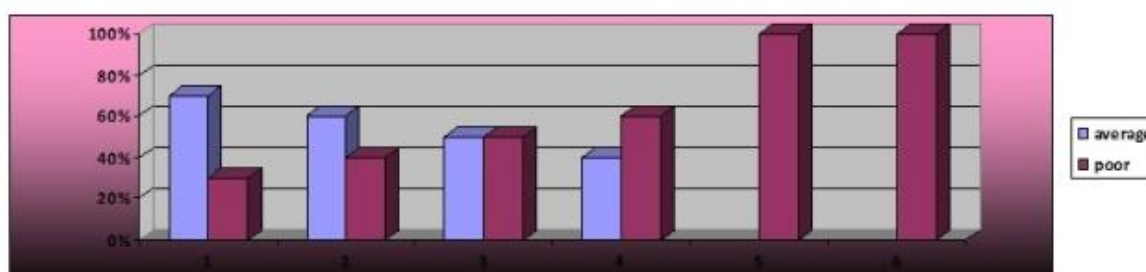


Figure 3; Dietary pattern of vegetables in Ramadi & Hit health Centers

- \*(1) Ramadi tomato- cucumber. \*(2) Hit tomato-cucumber. \*(3) Ramadi green pepper-lettuce. \*(4) Hit green pepper-lettuce, \*(5) Ramadi green leaves, spinach, chard, carrot, beet. \*(6) Hit green leaves, spinach, chard, carrot & beet.

-There was no intake of squash, cabbage in both centers.

**Figure (4):** Dietary pattern of fresh & dried fruit that 40%, 30% had average intake of orange respectively, 30% as average intake of apple & dates, granite in Ramadi center, the same picture for apple but improved for dates & granite to 20% as good & 60% as average intake in Hit center. Less intake of banana that reached to 20% as average intake while there was no intake of raisins in both centers beet.

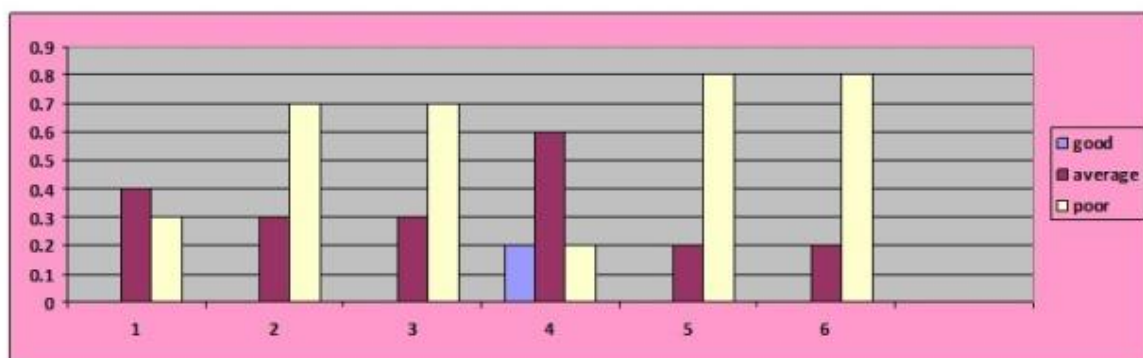


Figure 4; Dietary pattern of fruits in Ramadi &amp; Hit health Centers

\*(1) Ramadi orange.\*(2) Hit orange.\*(3) Ramadi apple, dates, granite.\*(4) Hit apple, dates, granite \*(5) Ramadi banana. \*(6) Hit banana.

## Discussion:

More than half of pregnant females were anemic in Ramadi center with a higher percentage & severe anemia in Hit center, by report of WHO found that 57.7% of pregnant females in Africa & Sudan were anemic <sup>[12]</sup> & 84.4% in Uganda <sup>[13]</sup> but in Saudi Arabia the prevalence of anemia during pregnancy was 5.2% <sup>[14]</sup>. Less than half of them were with normal increasing weight in both centers that a multiparty might be the cause of this range of increasing weight. The risk of developing anemia in pregnant women with 3–5 pregnancies is increased when compared with those who had less than 3 pregnancies <sup>[14]</sup>. In our population multiparty is 86% much higher than in other <sup>[15]</sup>. More than half of the anemic females drank tea > twice/ day directly after meal, the same results were found in Baghdad <sup>[16]</sup>. In Ethiopia (98%) drank tea before & after meals & (59.5%) of them have tea more than two times per day <sup>[17]</sup>.

In Turkey as a common unhealthy dietary habits, 90% of pregnant females drank tea at breakfast and just after meals and only 8% consumed animal protein daily <sup>[18]</sup>. In this study most of pregnant women had average & poor intake of diet rich with nutrients as poultry, fish & liver while Meat & poultry were the main dietary recommendations to prevent anemia as a good source of high quality protein, iron and zinc & other nutrients <sup>[19]</sup>. All of females had rich intake of starchy food & mostly had poor intake of fruits & vegetables. In Baghdad the proportion of pregnant females who usually consumed meat, chicken, eggs, and milk was 26.8 % & 21.4% for fruit consumption <sup>[20]</sup>.

In Iraq Meat consumption was reported to be 52.3g/day, 400 gram/person/week, 79 kg/capita/year while for USA 124 kg/capita/year and about 100kg/capita/year for European countries <sup>[21]</sup>, these data might explain the lower anemia prevalence among those developed countries while many people in developing countries exist on monotonous cereal based diets and have



little access to animal products or a variety of fruit and vegetables, <sup>[22],[23]</sup>, that rendering them at risk of micronutrient deficiencies <sup>[24]</sup>.

There were no educational sessions about healthy food while advices alone was sufficient to improve protein intake during pregnancy, reduce the risk of preterm birth by 54% and increase head circumference at birth <sup>[25]</sup>. This poor dietary status reflected by low socio- economic status makes micronutrient deficiency both clinical & subclinical more common <sup>[26]</sup>.

**Conclusion:** It is concluded that more than half of pregnant women were anemic, with multi & grant multiparty because of lack of spacing between deliveries. All of them didn't receive any educational sessions that need guidance in selecting nutrient dense foods & removing of bad nutritional habit of drinking tea with or directly after meals in both centers.

**Recommendations:** Continuous nutrition education and monitoring programs with proper nutrition counseling should be developed at all levels according to the recommendations to combat anemia. Community-based participatory women's group interventions have been found to be particularly effective in implementing behavior change amongst mothers with positive effects on newborn birth outcomes,

## References:

1. World Health Organization. Prevention and Management of Severe Anemia in Pregnancy: report of a technical working group. Geneva: 1994. WHL/FHE/MSM/93.3.
2. S. J. Baker and E. M. De Maeyer, "Nutritional anemia: Its understanding and control with special reference to the work of the world health organization," American Journal of Clinical Nutrition, vol. 32, no. 2, pp. 368–417, 1979
3. Vanden Broek N. The Cytology of Anemia in Pregnancy in West Africa Tropical Doctor. 1996; 26. 5–7.
4. Wang S, An L, Cochran SD: Women. Oxford text book of public health. Edited by: Detels R, McEwen J, Beaglehole R, Tanaka H. 2002, United States: Oxford University Press, 1587-601.
5. Matteli A, Donato F, Shein A. Malaria and anemia in pregnant women in Urban Zanzbar Tanzania. Annual Tropical Medical Parasitol. 1994; 88. 475–483.
6. Harrison KA. Maternal Mortality and Anemia in Pregnancy. W. Afr Medical Journal. 1975; 23. 27–3.
7. World Health Organization, Iraq Family Health Survey I.F.H.S, Anemia among women during pregnancy & lactation, 2006-2007.
8. Kathleen Mahan & Sylvia Escott - Stump. Krause's, Food Nutrition & Diet Therapy, China, 11<sup>th</sup> Edition, 2006; p188 –194.
9. Christensen RD, Ohls RK: Anemia's unique to pregnancy and the perinatal period. Wintrobe's clinical hematology. Edited by: Greer JP, Foerster J, Lukens NJ, Rodgers GM, Paraskevas F, Glader B. 2004, USA: Lippincott Williams and Wilkins, 2: 1467-1486.
10. Humphry RW, Cameron A, Gunn GJ, 2004. A practical approach to calculate sample size for herd prevalence surveys. Prev. Vet. Med. 65: 173-188.
11. World Health Organization. Iron Deficiency anemia: Assessment, Prevention & Control, Guide for managers. World Health Organization - Geneva, Department of Nutrition & Health. 2001: page 33.
12. Wild B .J. Bain B. J. Detection of normal & variant hemoglobin & analytical review. Annual Clinical Biochemistry, 2004; 41. 3. 55 – 69.
13. M. J Clinical Nutrition. Anemia in pregnancy in Uganda, 2000:70. 10. 550-600.
14. Thangaleela T, Vijayalakshmi P. Prevalence of anemia in pregnancy. Indian Journal Nutrition Diet 1994; 31.26-32.
15. R. G. Vivek, A. B. Halappanavar, P. R. Vivek, S. B. Halki, V. S. Maled, and P. S. Deshpande, "Prevalence of Anemia and its epidemiological," Determinants in Pregnant Women. , 2012 : vol. 5, no. 3, pp.
16. Alani Ban , habit of drinking tea in part of medical staff in Iraq , Nutrition Research Institution Conference . Baghdad. 2004 .
17. J. Haidar, "Prevalence of anemia in Ethiopian women," Journal of Health, Population and Nutrition, 2010 : vol. 28, no. 4, pp. 359–368.
18. Karaoglu L, Pehlivan E, Egri M, Deprem C, Gunes G, Genc MF, Temel I. The prevalence of nutritional anemia in pregnancy in an east Anatolian province, Turkey. BMC Public Health. 2010 Jun 10; 10:329.

19. Speedyp AW: Global Production and Consumption of Animal Source Foods. J Nutr. 2003, 133 (Suppl 2): 4048-4053.
20. Olfat A. Darwish & Ezzat K. Sabiha M. Abdalla Amine. Food habits during pregnancy and lactation in Iraq. United Nations University. archive.unu.edu/unupress/food/ 8F043e, UNU Collections.
21. Ghani R, Manji MA, Ahmed N. Hemoglobinopathies among five major ethnic groups in Karachi, Pakistan. Southeast Asian J Trop Med Public Health 2002; 33:855-61.
22. Diet and Nutrition in Pregnancy. Midwifery Today, The Birthkit, March 1, 2006:Volume 8, Issue 5.
23. Nutrition during pregnancy. Having a Baby Today. The Bradley Birth Method. 2006: July. Issue5.
24. Popkin BM. Nutrition in transition: the changing global nutrition challenge. Asia Pacific Journal of Clinical Nutrition, 2001, 10 (Suppl.1):S13-S18.
25. Ota E, et al. Antenatal dietary advice and supplementation to increase energy and protein intake. Cochrane Database of Systematic Reviews. 2012.
26. De Maeyer EM, Dallman P, Gurney JM, Hallberg L, Sood SK, Srikantia SG. Geneva: World Health Organization. Preventing and controlling anemia through primary health care: a guide for health administrators and program managers 1989; p. 58.