Cihan University-Erbil Scientific Journal (CUESJ)

Research Article

Nutritional Characteristics of Pregnant Women and its Relation with Anemia during Pregnancy in a Sample of Kurdish Women/Iraq

Rushna G. Abdulwahid[1], Hamdia M. Ahmed[2]*

[1]Cardiovascular Perfusionist, Surgical Specialty Hospital/Cardiac Center, Erbil, Kurdistan Region, Iraq. [2]Basic Sciences Unit, College of Medicine, Hawler Medical University, Erbil, Kurdistan Region, Iraq

ABSTRACT

Anemia in pregnancy is a major public health problem, especially in developing countries. This study aimed to assess the nutritional characteristics of pregnant women and find out its relationship with anemia during pregnancy. A descriptive, cross-sectional study was conducted on 600 pregnant women who attended four primary health-care centers which randomly selected according to the geographical area. A specially designed questionnaire was prepared by the researcher after extensive review of relevant literature. The severity of anemia is determined according to Alene and Dohe. Estimation and calculation of dietary characteristics was done according to food frequency questionnaire, frequencies and percentage, mean and standard deviations, and Chi-square test of association and regression analysis. There was a highly statistically significant association between anemia with eating vegetables and chicken, and a high significant relation of anemia with eating beef and eating nuts. Furthermore, there was a highly significant association between severity of anemia with eating nuts, and a significant association with eating vegetables, while there was no significant association with other variables. Logistic regression analysis revealed that eating less than normal of vegetables, beef, and nuts were indicated risks of anemia. Eating less than normal of vegetables, beef, and nuts were indicated risks of anemia during pregnancy.

Keywords: Anemia, diet, nutrition, 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 (Hb) concentration below 11 g/dL.[2]

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 to half of the burden of anemia globally. Iron deficiency affects 1.3–2.2 billion persons out of that 50 % are women of reproductive age. In Ethiopia, nearly 17% of women with age of 15–49 years are anemic of these 22% are pregnant women.[3]

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 consequences including fetal anemia, low birth weight (LBW), preterm delivery, intrauterine growth restriction, and perinatal mortality.[1]

A large number of women experience micronutrient deficiencies (of iron and Vitamin A, for instance); almost half of all pregnant women in the world are thought to have anemia and 9.8 million pregnant women have night blindness. An estimated 19.1 million pregnant women (the highest proportions in Africa and South-Eastern Asia) have low serum retinol concentrations. Maternal deficiencies in micronutrients may lower infant birth weight and jeopardize development and survival: Maternal iodine deficiency is associated with congenital malformations, and mental retardation in children and a link between Vitamin B12 deficiency and an increased risk of diabetes has been described in India. Insufficient intake of specific fatty acids, such as docosahexaenoic acid, may also impede children's development.[4]

During pregnancy, a woman needs good nutritional status for a healthy outcome. Women who have a poor nutritional

Corresponding Author:
Hamdia M. Ahmed, College of Health Sciences, Hawler Medical University, Erbil, Kurdistan Region, Iraq.
E-mail: hamdia76@gmail.com

Received: Apr 12, 2019
Accepted: Apr 18, 2019
Published: Jan 20, 2020

DOI: 10.24086/cuesj.v4n1y2020.pp1-37-44

status at conception are at higher risk of disease and death; their health depends greatly on the availability of food, and they may be unable to cope with their increased nutrient needs during pregnancy in situations of food insecurity. Maternal nutrition is a fundamental determinant of fetal growth, birth weight, and infant morbidity; poor nutrition often leads to long-term, irreversible, and detrimental consequences to the fetus.[4]

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 LBW in the next generation.[5] Low maternal Hb levels are associated with increased risk of preterm delivery, LBW babies, Apgar score <5 at 1 min and intrauterine fetal demise.[6]

According to the results of two previous studies in Erbil city regarding anemia during pregnancy, the prevalence of anemia was 55.5%, and 70% of participants had risk factors.[7,8] According to the knowledge of the researcher, no study focuses on dietary characteristics of anemic women. Because the anemia during pregnancy is still a major public health problem and a high prevalence in Kurdish women, therefore the researcher interested to study it concerning diet of them. Therefore, this study aimed to assess the nutritional characteristics of pregnant women and find out its relationship with anemia during pregnancy.

METHODS

A descriptive, cross-sectional study was conducted to assess the nutritional characteristics of pregnant women in Primary Health Care Centers (PHCC) of Erbil city, Kurdistan Region, Iraq. The study was conducted during the period October 1, 2015–November 13, 2016. The period included data collection, analysis, and interpretation. The study was conducted among pregnant women who attended antenatal care in PHCC in Erbil city. During time of data collection, 21 primary health centers were in Erbil city which 19 of them were provided with maternal and child health care services. Four PHCC were randomly selected according to the geographic area from North, South, East, and West. A purposive sampling of 600 pregnant women was included in the study. The 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 PHCC was according to their ratio in the targeted population. The sample size from Kurdistan PHCC was 117, Brayati was 168, Mahamad Bajalan was 117, and Malafande was 198. Mothers who had the following criteria were included in the study: Pregnant women who were in 1st, 2nd, and 3rd trimester of pregnancy and woman who accept to participate in the study. Pregnant women with history of chronic hypertension, diabetes, thyroid, cardiac diseases, and systematic lupus erythematosis, woman's with hemoglobinopathies such as thalassemia and woman's who have early and late vaginal bleeding or antepartum hemorrhage (abruption placenta and placenta previa) and hemorrhoid were excluded from the study.

Before data collection, the official permission was obtained from College of Nursing, Erbil General Directorate of Health, and PHCC for carrying out the study in Erbil City. Face to face interview method and reviewing antenatal card were used for data collection after taking permission and explanation the objectives of the study to the mother's. Each interview session took approximately 15–20 min. Blood Hb level was measured to assess severity of anemia. The severity of anemia is determined according to Alene and Dohe (2014) as the following: Mild (Hb level between 10.0 and 11 g/dl), moderate (Hb level between 7.0 and 9.9 g/dl), and sever (Hb level <7 g/dl).

A specially designed questionnaire was prepared by the researcher after extensive review of relevant literature, which consists of three parts: Socio-demographic characteristic obstetrical characteristics, dietary characteristic of pregnant women which included how often did the mother eat the followings: Fruit, vegetables, chicken, fish and seafood, beef, other meat, nuts, beans, dairy, eggs, grains, sweets, caffeinated soft drinks, coffee and tea, and what was the usual serving size for each of them. Estimation and calculation of dietary characteristics was according to Food Frequency Questionnaire (FFQ).

The validity of the study questionnaire was presented through panel of 14 experts of different specialties related to the field of the present study. They recommended some modifications and suggestions regarding some questions and all responses were taken into consideration in the final draft of the questionnaire format. A pilot study was conducted on 20 mothers who attended antenatal care units. According the results of the pilot study, some items of the questionnaire were removed and other was added to the questionnaire form. The proposal of the study was approved by Ethical Committee from the College of Nursing and General directorate of PHCC. Informed consent was taken from study participants. Data were entered into a computer using the Statistical Package for the Science Services (SPSS version 23) and following statistical procedures were applied: Frequencies and percentage, mean and standard deviations, and Chi-square test of association and regression analysis.

RESULTS

The highest percentage of 57.3% of the study sample aged between 25 and 36 years old. All participants of the study sample were living in urban areas. The highest percentages of 34.3% of the study sample were graduated from institute, college, and above. Regarding occupation, the highest percentages of 78.7% of the study samples were unskilled workers. Regarding economic status level, the highest percentage of 49.7% of the study sample had low economic status [Table 1].

Table 2 shows that the highest percentage of 59.2% of the study sample regarding age at the first pregnancy was in age group 13–23 years; regarding gravidity, the highest percentage of 64.3% of the study sample was multigravida; concerning parity, the highest percentage of 48.3% of the study sample was nulliparous, and the highest percentage of 71.5% of the study sample had no abortion.

Table 3 shows that the highest percentage of 53.2% of the study sample was in second trimester. The highest percentage of 92.3% of the study sample took iron and folic acid supplementation; the highest percentage of 87% of the study

Table 1: Socio-demographic characteristics of the study sample (n=600)

Variables	F	%
Age group/years		
13–24	208	34.7
25–36	344	57.3
37–48	48	8
Wife education		
Illiterate	96	16
Read and write only	24	4
Primary school	106	17.7
Intermediate school	85	14.2
Secondary school	83	13.8
Institute, college, and above	206	34.3
Wife occupation		
High professional job	12	2
Lower professional job	116	19.3
Unskilled workers	472	78.7
Economic status level		
Low economic status <90	298	49.7
Middle economic status 90–120	177	29.5
High economic status 121–150	125	20.8

Table 2: Obstetrical characteristics of the study sample (n=600)

Variables	F	%
Age at first pregnancy		
13–23	355	59.2
24–34	229	38.2
35–45	16	2.7
Gravidity		
Primigravida	214	35.7
Multigravida	386	64.3
Parity		
Nulliparous	290	48.3
Primiparous	142	23.7
Multiparous	96	16
Grand multipara	72	12
Abortion		
None	429	71.5
1–3	171	28.5
Trimester		
First trimester	33	5.5
Second trimester	319	53.2
Third trimester	248	41.3
Iron, folic acid, Fero-folic supplementation		
Yes	554	92.3
No	46	7.7
Number of iron and folic acid tablet taking/month		
<30	522	87
≥30	32	5.3
None	46	7.7
Anemia before pregnancy		
Yes	13	2.2
No	587	97.8

Table 3: Prevalence and severity of anemia among the 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

sample took <30 tabs/month, the highest percentage of 97.8% of the study sample did not have anemia before pregnancy.

Table 4 shows the prevalence and severity of anemia of the study sample. Prevalence of anemia during pregnancy was 46.2%, regarding the severity of anemia the highest percentage of 67.1% of the study sample had mild anemia, while the lowest percentage of 32.9% of the study sample had moderate anemia, and there were no cases for severe anemia.

Table 5 shows the dietary characteristics of the study sample for eating daily frequency, serving size, and daily amount. The highest mean for eating daily frequency was related to drinking coffee and tea 1.99, eating fruit 1.55, eating dairy 1.52, and 1.17 eating grains, while the lowest mean 0.24 eating fish and seafood, 0.31 caffeinated soft drinks, and 0.47 eating beef. Regarding serving size, the highest mean was 0.98, 0.96, 0.95, and 0.93, respectively, for drinking coffee and tea, eating fruit, eating eggs, and eating dairy, while the lowest mean was 0.50 and 0.51 for eating chicken and beef and fish and seafood, respectively. Regarding daily amount, drinking coffee and tea, eating fruit, dairy, and eggs had the highest mean (1.95. 1048, 1.41, and 0.84, respectively), while the lowest mean of daily amount was 0.12 for eating fish and seafood, 0.18 caffeinated soft drinks and 0.23 eating beef.

Table 6 shows that all of the study samples had dietary daily amounts less than normal regarding fish and seafood, beans, grains, and eggs, while fruits 92.8%, coffee and tea 83.8%, and nuts 81.5% had the highest normal dietary amounts. More than half of the study sample had normal dietary daily amounts of dairy 54.7% and beef 52.2%. Furthermore, it shows that there was a highly statistically significant association between anemia with eating vegetables and chicken ($P < 0.001$), and a highly significant relation of anemia with eating beef ($P < 0.01$), and eating nuts ($P < 0.05$). There was no significant association of anemia with other variables ($P > 0.05$) such as eating fish and seafood, beans, eggs, and grains.

Table 4: Dietary characteristics of the study sample (n=600)

Dietary characteristics	Eating daily frequency (mean)	Serving size (mean)	Daily amount (mean)
Fruit (apples, bananas, oranges, etc.)	1.55	0.96	1.488
Vegetables (carrots, mushrooms, potatoes, etc.)	0.92	0.57	0.524
Chicken (fried chicken, in soup, grilled chicken, etc.)	0.62	0.50	0.31
Fish and seafood (tuna, shrimp, crab, etc.)	0.24	0.51	0.122
Beef (steak, meatballs, etc.)	0.47	0.50	0.235
Nuts (almonds, cashews, walnuts, etc.)	0.86	0.63	0.541
Beans (tofu, chickpeas, chili, etc.)	0.82	0.56	0.459
Dairy (cheese, milk, yogurt, etc.)	1.52	0.93	1.413
Eggs (omelet, in salad, etc.)	0.89	0.95	0.845
Grains (bread, pasta, rice, etc.)	1.17	0.63	0.737
Sweets (candy, cookies, pie, etc.)	0.67	0.71	0.475
Caffeinated soft drinks (cola, diet cola, energy drinks, etc.)	0.31	0.59	0.182
Coffee and tea (hot coffee, iced coffee, black tea, etc.)	1.99	0.98	1.95

Table 5: Dietary daily amounts of the study sample (n=600)

Dietary daily amount	Less than normal		Normal	
	F	%	F	%
Fruit (apples, bananas, oranges, etc.)	43	7.2	557	92.8
Vegetables (carrots, mushrooms, potatoes, etc.)	504	84	96	16
Chicken (fried chicken, in soup, grilled chicken, etc.)	588	98	12	2
Fish and seafood (tuna, shrimp, crab, etc.)	600	100	0	0
Beef (steak, meatballs, etc.)	287	47.8	313	52.2
Nuts (almonds, cashews, walnuts, etc.)	111	18.5	489	81.5
Beans (tofu, chickpeas, chili, etc.)	600	100	0	0
Dairy (cheese, milk, yogurt, etc.)	272	45.3	328	54.7
Eggs (omelet, in salad, etc.)	600	100	0	0
Grains (bread, pasta, rice, etc.)	600	100	0	0
Sweets (candy, cookies, pie, etc.)	533	88.8	67	11.2
Caffeinated soft drinks (cola, diet cola, energy drinks, etc.)	582	97	18	3
Coffee and tea (hot coffee, iced coffee, black tea, etc.)	97	16.2	503	83.8

Table 7 shows that there was a highly significant association between the severity of anemia with eating nuts ($P < 0.01$), and a significant association with eating vegetables ($P < 0.05$), while there was no significant association with other variables ($P > 0.05$).

Logistic regression analysis revealed that eating less than normal of vegetables, beef, and nuts were indicated risks of anemia ($P < 0.05$ odds ratio [OR] = 0.543, 0.147, 0.611, 0.493, 0.689, 0.641, respectively). On the other hand, eating less than normal of chicken was indicated no risks of anemia ($P > 0.05$ OR = 3.062, 1.433, 1.039, respectively) [Table 8].

DISCUSSION

Prevalence of anemia in the present study was 46.2% which indicated severe public health problems, which was 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, and Kenya was 40% in 2014. Prevalence of anemia 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 2005, 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, and Iran was 4.7% in 2010.

The results of a study done by Kefiyalew *et al.*[9] found that 55%, 32.5%, and 12.5 of the study sample had mild, moderate, and severe anemia, respectively, which was consistent with the results of the present study. Dim and Onah[2] reported that 90.7% had mild anemia, 9.3% had moderate anemia, and no cases of severe anemia were detected on their studies which were consistent with the results of the present study.

Women from lower socioeconomic groups are at higher risk of inadequate protein intake due to the associated costs. They are also more likely to choose less expensive processed foods which would put them at risk of small for gestational age babies.[10]

Results of the present study, there was a high significant ($P < 0.001$) association of anemia with eating vegetables, chicken, and beef, and a significant ($P < 0.05$) association with eating nuts, while there was no significant ($P > 0.05$) association between anemia and eating of fruits, dairy,

Table 6: Association of dietary daily amounts with anemia during pregnancy (n=600)

Variables	Anemic		Non-anemic		*P*-value Chi-square test
	F	%	F	%	
Fruit (apples, bananas, oranges, etc.)					0.962
Less than normal	20	46.5	23	53.5	
Normal	257	46.1	300	53.9	
Vegetables (carrots, mushrooms, Potatoes, etc.)					0.002
Less than normal	219	43.5	285	56.5	
Normal	58	60.4	38	39.6	
Chicken (fried chicken, in soup, grilled chicken, etc.)					0.001
Less than normal	277	47.1	311	52.9	
Normal	0	0.0	12	100.0	
Fish and seafood (tuna, shrimp, crab, etc.)					Constant
Less than normal	277	46.2	323	53.8	
Normal	0	0.0	0	0.0	
Beef (steak, meatballs, etc.)					0.004
Less than normal	115	40.1	172	59.9	
Normal	162	51.8	151	48.2	
Nuts (almonds, cashews, walnuts, etc.)					0.031
Less than normal	41	36.9	70	63.1	
Normal	236	48.3	253	51.7	
Beans (tofu, chickpeas, chili, etc.)					Constant
Less than normal	277	46.2	323	53.8	
Normal	0	0.0	0	0.0	
Dairy (cheese, milk, yogurt, etc.)					0.060
Less than normal	137	50.4	135	49.6	
Normal	140	42.7	188	57.3	
Eggs (omelet, in salad, etc.)					Constant
Less than normal	277	46.2	323	53.8	
Normal	0	0.0	0	0.0	
Grains (bread, pasta, rice, etc.)					Constant
Less than normal	277	46.2	323	53.8	
Normal	0	0.0	0	0.0	
Sweets (candy, cookies, pie, etc.)					0.425
Less than normal	243	45.6	290	54.4	
Normal	34	50.7	33	49.3	
Caffeinated soft drinks (cola, diet cola, energy drinks, etc.)					0.529
Less than normal	270	46.4	312	53.6	
Normal	7	38.9	11	61.1	
Coffee and tea (hot coffee, iced coffee, black tea, etc.)					0.536
Less than normal	42	43.3	55	56.7	
Normal	235	46.7	268	53.3	

sweets, and taking caffeinated soft drinks, drinking coffee, and tea.

Furthermore, the present study showed that there was no significant ($P > 0.05$) association of severity of anemia with eating beef, which was consistent to the results of Aikawa *et al.*,[11] who found that there was no significant association of Hb level with consumption of meat and meat products.

Results of the present study showed that eating beef less than normal had 0.688 times more likely to express risks of anemia than in nonanemic, which was consistent to the results

Table 7: Association of the severity of anemia with dietary daily amounts of the study sample (n=277)

Variables	Moderate		Mild		*P*-value Chi-square test
	F	%	F	%	
Fruit (apples, bananas, oranges, etc.)					0.090
Less than normal	10	50.0	10	50.0	
Normal	81	31.5	176	68.5	
Vegetables (carrots, mushrooms, potatoes, etc.)					0.027
Less than normal	79	36.1	140	63.9	
Normal	12	20.7	46	79.3	
Chicken (fried chicken, in soup, grilled chicken, etc.)					Constant
Less than normal	91	32.9	186	67.1	
Normal	0	0.0	0	0.0	
Fish and seafood (tuna, shrimp, crab, etc.)					Constant
Less than normal	91	32.9	186	67.1	
Normal	0	0.0	0	0.0	
Beef (steak, meatballs, etc.)					0.326
Less than normal	34	29.6	81	70.4	
Normal	57	35.2	105	64.8	
Nuts (almonds, cashews, walnuts, etc.)					0.007
Less than normal	6	14.6	35	85.4	
Normal	85	36.0	151	64.0	
Beans (tofu, chickpeas, chili, etc.)					Constant
Less than normal	91	32.9	186	67.1	
Normal	0	0.0	0	0.0	
Dairy (cheese, milk, yogurt, etc.)					0.797
Less than normal	44	32.1	93	67.9	
Normal	47	33.6	93	66.4	
Eggs (omelet, in salad, etc.)					Constant
Less than normal	91	32.9	186	67.1	
Normal	0	0.0	0	0.0	
Grains (bread, pasta, rice, etc.)					Constant
Less than normal	91	32.9	186	67.1	
Normal	0	0.0	0	0.0	
Sweets (candy, cookies, pie, etc.)					0.217
Less than normal	83	34.2	160	65.8	
Normal	8	23.5	26	76.5	
Caffeinated soft drinks (cola, diet cola, energy drinks, etc.)					0.807
Less than normal	89	33.0	181	67.0	
Normal	2	28.6	5	71.4	
Coffee and tea (hot coffee, iced coffee, black tea, etc.)					0.521
Less than normal	12	28.6	30	71.4	
Normal	79	33.6	156	66.4	

of Abriha *et al.*,[12] who mentioned that consumption of meat was another factor which showed significant association with anemia in pregnant women.

El-Hindi[13] mentioned on their results of the study that there was a statistically significant difference ($P < 0.05$) between study populations with respect to nutritional, dietary status. Kefiyalew *et al.*[9] mentioned on their results that there was no significant ($P > 0.05$) association of eating red meat, poultry, fish consumption, fruit and vegetable consumption with anemia, which was in contrast to the results of the present study regarding eating red meat, vegetables, and chicken,

Table 8: Logistic regression analysis of the factors associated with anemia

Variables	*P* value	Odd's ratio	95% CI of OR
Vegetables (carrots, mushrooms, potatoes etc.)			
Less than normal	0.003	0.493	0.308–0.788
Normal (reference category)			
Chicken (fried chicken, in soup, grilled chicken, etc.)			
Less than normal	0.999	1.039	1.017–1.061
Normal (reference category)			
Beef (steak, meatballs, etc.)			
Less than normal	0.035	0.689	0.488–0.973
Normal (reference category)			
Nuts (almonds, cashews, walnuts, etc.)			
Less than normal	0.053	0.641	0.409–1.005
Normal (reference category)			

OR: Odds ratio, CI: Confidence interval

while it was consistent regarding eating fruits. Aikawa *et al.*[11] found on their results that there was no significant ($P > 0.05$) association of anemia with eating fruit which was consistent with the results of present study, while it was inconsistent regarding eating chicken, vegetable, meat, and meat products. Jufar and Zewde[14] found on their results that there was no significant ($P > 0.05$) association of anemia with drinking tea and coffee and taking fruit, which was consistent with results of present study, while it was in contrast regarding eating animal foods and green leafy vegetables. The results of Aikawa *et al.*[11] indicated that there was no significant ($P > 0.05$) association of Hb level with consumption of fish, seafood, and eggs, while there was a significant ($P < 0.05$) relation of consumption of beans with Hb levels. Khapre *et al.*[15] mentioned that there was no significant ($P > 0.05$) difference of degree of anemia and was found between vegetarian and non-vegetarian type of diet. Viveki *et al.*[16] found on their results that there was no significant association of severity of anemia with dietary habits such as vegetarian and mixed diets. Clinical practice guideline nutrition for pregnancy[10] described the food pyramid guidelines as the following: Starchy carbohydrates, such as whole grains and fiber-rich foods including breads, cereals potatoes, pasta, and rice, six or more servings a day from this group; where one serving is 1 bowl of cereal, 1 slice of bread or 1 medium potato, fruit and vegetables, at least five or more servings a day; 1 serving is 1 medium-sized fruit, for example, 1 apple or 3 dessert spoons of vegetables, dairy Foods which includes milk, cheese, and yogurt, 3 servings a day from this group; 1 serving is 125 g yogurt, 25 g of cheese or 200 ml milk, and protein foods including meat, poultry, fish, eggs or legumes, at least 2 servings a day: Where one portion is 50–75 g (2–3 oz) cooked meat, 100 g (4 oz) fish, 2 eggs or 6 dessert spoons beans. Murray and Mckinney[17] described the food plan and amounts per serving with recommendations intake for pregnancy as the following: Food and amounts/serving of whole grains (1 oz = 1 slice bread and ½ cup rice or pasta) for vegetables, fruits, and dairy group (1 cup milk or yogurt, 1.5 ounce hard cheese, and 2 cup cottage cheese) for protein group (1 ounce meat/poultry/fish, 1 egg, ¼ cup cooked beans, ¼ cup tofu, and 1 tablespoon peanut butter), while the recommended intakes for them as following: For whole grains 7–9 oz, vegetables 3–3.5 cup, fruits 2 cup, dairy group 3 cup, and protein group 6–6.5 oz.

Karaoglu *et al.*[18] conducted a cross-sectional study about the prevalence of nutritional anemia in pregnancy in an East Anatolian province, Turkey, who found that 40.2% of study sample consumed egg, 8.1% consumed red meat, poultry or fish, and 42.0% consumed fruit and vegetables daily. El-Hindi (2011) concluded in a study done regarding nutrition that 55.4% of the study sample get regular nutrition, while 44.6% get not regular nutrition in anemic group, in non-anemic group and 78.3% of study sample get regular nutrition while 21.7% get irregular nutrition during pregnancy. Results of a study done by Karaoglu *et al.*[18] showed that 19.4% of study samples ate one portion of red meat, poultry, and fish consumption every day, while 27.8% of them ate less than frequent of red meat, poultry, and fish consumption. Regarding eating fruit and vegetable consumption, 24.3% of participants ate one portion, while 29.1% of participants ate less frequents. These results are consistent with the results of the present study regarding eating chicken and vegetables, while they are in contrast regarding eating fruits and beef. Plante *et al.*[19] conducted a survey on Nunavik women about iron deficiency and anemia among women, they found that less than half 37.1% of the sample ate normal meat, which was consistent to the results of the present study, while it was in contrast regarding eating sweets, which indicated that less than half 39.4% of the sample ate normal sweets, on the other hand, it is also in contrast regarding drinking coffee and tea, which found that less than half 37.1% of the study sample drinking less than normal coffee and tea.

CONCLUSION

Eating less than normal of vegetables, beef, and nuts were indicated risks of anemia during pregnancy.

REFERENCES

1. L. Gedefaw, A. Ayele, Y. Asres and A. Mossie A. "Anemia and associated factors among pregnant women attending antenatal care clinic in Wolayita Sodo town, Southern Ethiopia". *Ethiopian journal of Health Sciences*, vol. 25, no. 2, pp. 155-162, 2015.
2. C. Dim and H. Onah. "The prevalence of anemia among pregnant women at booking in Enugu, South Eastern Nigeria. *Medscape General Medicine*, vol. 9, no. 3, p. 11, 2007.
3. M. Yesuf and M. Wassie. "Prevalence and associated factors of anemia among pregnant women of Mekelle town: A cross sectional study". *BMC Research Notes*, vol. 7, p. 888, 2014.
4. World Health Organization. "*Nutrition of Women in the Preconception Period During Pregnancy and the Breastfeeding Period*". Provisional Agenda Item, Meeting, 2012.
5. Kalaivani, K. "Prevalence and consequences of anemia in pregnancy". *The Indian Journal of Medical Research,* vol. 130, pp. 627-633, 2009.
6. F. Lone, R. Qureshi and F. Emanuel. "Maternal anaemia and its impact on perinatal outcome". *Tropical Medicine and International Health*, vol. 9, no. 4, pp. 486-490, 2004.
7. A. Ahmed and K. Ali. "Maternal anemia status among pregnant women in Erbil city", Iraq. *World Family Medicine Journal*, vol. 11, no. 8, p. 23, 2013.
8. T. Al-Khafaji, J. Zangana and S. Dauod. "Prevalence of pregnant

women with multiple risk factors attending primary health center in Erbil. *International Journal of Humanities Social Sciences and Education*, vol. 2, no. 5, pp. 104-113, 2015. Available from: http://www.arcjournals.org. [Last accessed on 2015 Apr 20].
9. F. Kefiyalew, E. Zewene, Y. Asres and L. Gedefaw. Anemia among pregnant women in Southeast Ethiopia: prevalence, severity and associated risk Factors. *BMC Research Notes*, vol. 7, p. 771, 2014. Available from: http://www.biomedcentral.com/1756-0500/7/771. [Last accessed on 2015 Jun 13].
10. Clinical Practice Guideline, Nutrition for Pregnancy. "Institute of Obstetricians and Gynaecologists, Royal College of Physicians of Ireland and Directorate of Clinical Strategy and Programmes, Health Service Executive: Version 1.1 Date of Publication: Guideline No.27, 2013.
11. R. Aikawa, N. Khan, S. Sasaki and C. Binns. "Risk factors for iron-deficiency anemia among pregnant women living in rural Vietnam". *Public Health Nutrition*, vol. 9, no. 4, pp. 443-448, 2005.
12. A. Abriha, M. Yesuf and M. Wassie. "Prevalence and associated factors of anemia among pregnant women of Mekelle town: A cross sectional study". *BMC Research Notes*, vol. 7, p. 888, 2014. Available from: http://www.biomedcentral.com/1756-0500/7/888. [Last accessed on 2015 May 06].
13. M. El-Hindi. "Iron Status of Pregnant Women and their Newborns in Gaza". A thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Biological Sciences. Medical Technology Faculty of Science. Gaza, 2011.
14. A. Jufar and T. Zewde. "Prevalence of Anemia among Pregnant Women Attending Antenatal Care at Tikur anbessa specialized hospital, Addis Ababa Ethiopia". *Journal of Hematology and Thromboembolic Diseases*, vol. 2, p. 1, 2014.
15. M. Khapre, R. Meshram and A. Mudey. "Study on multiple causal factors associated with varying degree of anemia among rural pregnant women". *International Journal of Medical Science and Public Health*, vol. 2, no. 2, pp. 268-272, 2013.
16. R. Viveki, A. Halappanavar, P. Viveki, S. Halkis, V. Maled and P. Deshpande. "Prevalence of anaemia and its epidemiological determinants in pregnant women". *Al Ameen Journal of Medical Scinencs*, vol. 5, no. 3, pp. 216-223, 2012.
17. S. Murray and E. Mckinney. "*Foundations of Maternal-Newborn and Women's Health Nursing*". 6th ed. United States: Saunders, pp. 144-150, 551-553, 2014.
18. L. Karaoglu, E. Pehlivan, M. Egri, C. Deprem, G. Gunes, M. Genc and I. Temel. "Therprevalence of nutritional anemia in pregnancy in an east Anatolian province, Turkey". *BMC Public Health*, vol. 10, p. 329, 2010. Available from: http://www.biomedcentral.com/1471-2458/10/329. [Last accessed on 2015 Jul 16].
19. C. Plante, C. Blanchet and H. Brien. "Iron Deficiency and Anemia Among Women in Nunavik, 2007. Available from: http://www.inspq.qc.ca. [Last accessed on 2015 Mar 03].