Nutrition and Food Sciences

Assessment of Nutritional Status of pregnant women suffering from anemia in Berket El-Saba city, Menoufia, Egypt

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Abstract

This research was conducted to evaluate the nutritional status of pregnant women. A total of 60 pregnant women participated in the study, and their ages ranged from 19 to 45 years. Anthropometric measurements, food habits, nutrient intake and socio-economic parameters were assessed. Blood samples were collected to determine CBC profile and ferritin. The results showed that pregnant women with anemia suffer from a deficiency of ferritin and hemoglobin. The BMI of cases was about 28, which indicated that the women were overweight. Most of the cases in this study did not suffer from any diseases, but a few suffered from high blood pressure. Most cases ate two meals, did not care about breakfast and drank milk. The pregnant women had a lack of vitamin D, vitamin B1, vitamin C, vitamin A, niacin and vitamin B6 intake compared to RDA. So, the study concluded that pregnant women neither careful about their BMI during pregnancy nor about the quantity and quality of nutrients needed to avoid nutritional diseases such as anemia.

Keywords: Pregnancy, anemia, hemoglobin, food habits.

Introduction

Pregnancy is a dynamic, anabolic, characterized by a series of small adjustments whose purpose is to allow growth and development of the fetus while maintaining maternal homeostasis and preparing for breast feeding. These adjustments relate to changes in maternal behavior, affect the metabolism of all nutrients. They depend primarily on the nutritional status of the mother before conception and explain its ability to adapt to various nutritional situations (5).

It is believed that during pregnancy, it is necessary to have a proper balanced diet to ensure sufficient energy intake for adequate growth of fetus without drawing on mother's own tissues to maintain her pregnancy (28).

Pregnancy is also a period of a significant increase in iron requirement; the demand is higher due to physiological changes in maternal red blood cell mass and also due to the needs for the development and growth of the placenta and fetus. Despite increased iron requirements, pregnancy is also a period of increased risk for anemia, which is higher than that of non-pregnant state (9).

Anemia (especially iron deficiency anemia) in pregnancy is defined as a haemoglobin level below 11 gm/dl. It is a worldwide public health problem disturbing both developing and developed countries with the consequences of health impact and economic development (3). The causes of anemia can be nutritional and no nutritional. The leading cause of anemia throughout the world is nutritional anemia which is particularly common in women of childbearing age and specifically during pregnancy (14). Anemia is the most common condition that predominantly affects women of childbearing age especially pregnant mothers. Although anemia occurs at all stages of life, it is highly prevalent among pregnant women because of the need for iron for women themselves and their fetus . Globally, 38% (32.4 million) of pregnant women aged 15-49 years were affected by anemia (27,33). In low-income countries, iron deficiency anemia in pregnancy attributes about half of all types of anemia to improper nutrition, living in an unhygienic environment, high infection burden, lack of health care facilities and proper utilization, low educational status, early marriage, short birth interval, and lack of awareness of antenatal care. Anemia during pregnancy becomes an important public health problem because it results in high rates of maternal mortality, preterm birth, low birth weight, and other health problems. It is important to identify risk factors that contribute to the development of anemia in pregnant women to successfully prevent it and implement a global nutrition target of reducing the magnitude of anemia among pregnant women by half (15).

The purpose of this study was assessment of nutritional status of anemic pregnant women in Shibin El-Kom, Menoufia, Egypt.

Subjects and methods

Research setting design

A retrospective design was used in the study at Menoufia Governorate, this is with the written consent of the cases. The present study started in April 2020 and ended in October 2020.This design according to the available literature is considered to be appropriate as it allows the researcher to assess the dependent variable in the present (anemia) and then links this factors that affecting occurring on the pregnant women and physical health. The

total sample size was (60 pregnant women) in the second period (4-6 months) of their ages ranged between 19-45 year as a case study in Berket El-Saba Central Hospital.

Instruments

The instrument of this study consisted of a structured interviewing questionnaire which consists of three parts:

The first is to elicit the socioeconomic characteristics of the studied pregnant women.

The second is to collect data about the diet and health history of the studied pregnant women.

The third is anthropometric measurements and laboratory investigation.

Methods

Demographic data

Information about socio-economic status including age, sex, residence, educational status, social status, employment status, work nature, monthly income, food expenditure and medical expenditure were collected by questionnaire through interview.

Dietary intake

A pre designed form was used to determine food intake by using 24-hour dietary recall sheet for seven days to obtain accurate details of foods and beverages consumed by the pregnant and calculate the nutritive value of the intake using food composition tables for Egypt. To compare the nutritional value of the food consumed with the per caput recommended dietary intake (20).

Anthropometric measurement

The anthropometric measurements 5gtt6 included weight, height, The body mass index (BMI = w / h 2 kg / m2) was selected (31). World Health Organization. Obesity: Preventing and managing the global epidemic. Report of a WHO consultation on obesity. Geneva : Technical report series n° 894 (30).

Laboratory investigation

CBC profile and ferritin were determined (6,17).

Statistical analysis

IBM personal computer equipped with a programme of SPSS (26) package was used to analyse the data.

Results and discussion

Table (1) showed the means and standard deviations for laboratory investigation of anemic pregnant women. The hemoglobin, hematocrit, red blood cells, mean corpuscular volume (MVC),mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC),red cell distribution width (RDW-CV), platelets count, total leucocytes count, white cells count and ferritin averages of sample study were determined , the results showed that the decreasing of the mean value of blood parameters as

hemoglobin ,ferritin, hematocrit and MCV when compared with the normal range and the level of hemoglobin was recorded 9.36±1.458 g/dl and this level led to accrued moderate anemia (32) which reported that the moderate anemia range was in the range of 8-11. While, the other parameters were in the normal range except the while blood cells was higher the normal range and this indicated to the presence of body inflammation. Our results agreed with De Sá et al.,(2015) who reported that hemoglobin and hematocrit are generally used for the diagnosis of anemia in populations (8). Also, Dani et al. (2008) reported that serum ferritin has been considered, along with other indicators, the best indicator to detect iron deficiency (7).

Table (1) : Means and standard deviations for laboratory investigation of anemic pregnant women

Laboratory investigation	Study Sample (60)	
	Mean±SD	Normal range
Hemoglobin (g/dl)	9.36±1.458	11.5-15
Hematocrit (L/L)	32.50±5.868	36-46
Red blood cells(106/mm3)	4.85±1.666	4-5
MCV (fL)	78.62±8.459	80-100
MCH (pg)	31.28±3.016	26-34
MCHC(g/L)	34.00±4.417	31-37
RDW-CV%	14.26±3.033	11.5-14.9
Platelets count(106/mm3)	231.97±8.980	150-450
Total leucocyte count	11.20±1.796	4-11
White cells count(103/mm3)	11.13±4.810	5-10
Ferritin (ng/ml)	9.42±2.444	11-370

Data of the means and standard deviations for anthropometric measurements of anemic pregnant women were tabulated in table (2). The age average of sample study was 28.33±5.341 years. The highest average of sample study was 159.55±5.426 cm. The actual weight average of sample study was 72.28±9.716 kg.

Previous studies from different settings have demonstrated that anemia status and body weight have certain correlations, which implies that the changing trend in bodyweight and composition in a population may alter underlying causes of anemia and may require modification in intervention strategies (22). Ghose et al., (2016) found that overweight or obese women had higher odds of suffering from anemia than women with normal weight status (12). While some studies found no significant relationship between anemia and BMI, the association between underweight and anemia status remains less clear from previous researches (29).

Table (2): Means and standard deviations for anthropometric measurements of anemic pregnant women

Anthropometric measurements	Study Sample (60) Mean±SD
Age	28.33±5.341
Height	159.55±5.426
Actual weight	72.28±9.716
BMI	28.33±3.380

Table (3) showed the characteristics of socioeconomic variables of anemic pregnant women. With respect to education status, 50.0%of pregnant women had B.Sc; however 13.3%had doctor degree, but the lowest percentage had master degree(6.7%). For women's Job, the highest percentage of studied sample was none working women(73.3%) while 26.7% were working. The majority of pregnant women no have salary (73.3%); followed by other 26.7% have salary. These results agreed with Lebso et al., (2017) who reported that the socio-economic status is correlated with anemia among pregnant women. Women with lower socioeconomic class had a higher prevalence of anemia than women had high socioeconomic status (16). Also, WHO (2020) reported that the prevalence of anemia increased in a social imbalance, it is more prevalent in the lower social strata, in the lower income groups and in the least educated fraction of a population (34).

Table (3) The characteristics of social variables of anemic pregnant women

Variable	Study sample (60)	
	Frequency	Percent %
Educational status		
Illiterate	0	0.0
Primary	0	0.0
Preparatory	0	0.0
Secondary	0	0.0
artificial secondary	18	30.0
B.Sc	30	50.0
Master	4	6.7
Doctor of Philosophy	8	13.3
Total	60	100.0
Job		
Work	16	26.7
No Work	44	73.3
Total	60	100.0

Variable	Study sample (60)	
	Frequency	**Percent %**
Income		
Having salary	16	26.7
No salary	44	73.3
Total	60	100.0

Table (4) revealed the characteristics of the healthy status for anemic pregnant women. With regard tokind of previous childbirth, it was found that about (50.0%) of pregnant women with anemia had no gestation; whereas (23.4 and 26.7%) of sample study respectively had normal and caesarean childbirth. As for suffering from diseases during gestation, it was noticed that pregnant women with anemia (86.7%) were suffered from diseases during gestation; while (13.3%) of sample study weren't suffered from diseases during gestation. These results agreed with Cotta et al., (2011) who reported that an increased risk of anemia in cesarean births, which may be due to the fact that this form of delivery leads to intense bleeding, nearly double that of vaginal delivery (4).

It was found (86.7%) of sample study had no disease, whereas (3.3 and 10.0%) respectively had hypertension and others diseases, this result corresponds to Paul et al.,(2008)who have demonstrated that poor blood pressure control is associated with decreased hemoglobin concentration (21).

Also, it was observed about (100.0%) of sample study had medical care during gestation. With regard to expose to any kind of radiation during gestation, it was found that about (95.0%) of pregnant women with anemia weren't exposed to any kind of radiation during gestation; whereas (5%) of sample study were exposed to radiation during gestation.

As for operated any surgery, it was noticed that pregnant women with anemia (60.0%) were operated surgery; while (40%) of sample study weren't operated any surgery. These results agreed with Shankar et al., (2010)who reported that bariatric surgery can inhibit iron absorption (25).

Table (4) The characteristics of the healthy status of anemic pregnant women

Variable	Study Sample (60)	
	Frequency	**Percent %**
What kind of previous childbirth?		
No gestation	30	50.0
Normal	14	23.4
Caesarean	16	26.7
Total	60	100.0
Did you suffer from diseases during gestation?		

Variable	Study Sample (60)	
	Frequency	**Percent %**
Yes	8	13.3
No	52	86.7
Total	60	100.0
What kind of disease?		
No disease	52	86.7
Diabetes	0	0.0
Hypertension	6	10.0
Others	2	3.3
Total	60	100.0
Did you have medical care during gestation?		
Yes	60	100.0
No	0	0.0
Total	60	100.0
Did you expose to any kind of radiation during gestation?		
Yes	3	5.0
No	57	95.0
Total	60	100.0
Did you operate any surgery?		
Yes	36	60.0
No	24	40.0
Total	60	100.0

Table (5) illustrated the characteristics of the food habits of anemic pregnant women. For number of meals the pregnant women eat at a day, the highest percentage of pregnant women with anemia was eaten two meals (83.3%); however (16.7%) were eaten three meals. These results agreed with Gebremedhin and Enquselassie, (2005), who reported that pregnant women who had meal frequency less than two times at higher risk of developing anemia than those whose meal frequency was more than three times per day. This might be due to the fact that pregnancy is a special period with increased energy and nutrient requirement which can be fulfilled with increased meal frequency (11). The lowest percentage of pregnant women with anemia sometimes eaten breakfast (6.7%); while the highest percentage of sample study wasn't eaten breakfast (93.3%). These result agreed with Izah, (2011)who reported that breakfast is an important activity before doing any physical activity because breakfast contributes about 25% of the nutritional needs of

a day (13), which is quite significant, energy is a source of erythrocyte formation, whereas hemoglobin is a part of erythrocytes so that when energy intake is less it will cause a decrease in erythrocyte formation and result in decreased Hb levels (18).

With regard to eat snacks, the highest percentage of sample study sometimes eaten snacks (68.3%); followed by eaten snacks (21.7%); while the lowest percentage of sample study wasn't eaten snacks (10.0%). With respect to eat fried food, the highest percentages of pregnant women with anemia sometimes eaten fried food (55.0%); however the lowest percentage of sample study wasn't eaten fried food (21.7%); followed by eaten fried food (23.3%).The majority of pregnant women with anemia eaten fatty foods (56.7%); followed by sometimes eaten fatty foods (41.7%); while the lowest percentage of sample study have no fatty foods (1.7%). The majority of pregnant women with anemia drunk milk (75.0%); followed by sometimes drunk milk (18.3%)while the lowest percentage of sample study wasn't drunk milk (6.7%). These results agreed with Seriki et al., (2017), who reported that calcium has been shown to have negative effects on iron absorption also, milk proteins have been shown to inhibit iron absorption (24). With regard to drink tea, the highest percentage of sample study sometimes drunk tea (35.0%); followed by drunk tea (33.3%); while the lowest percentage of sample study wasn't drunk tea (31.7%). These results are in agreement with Milman (2008), who reported that consuming different types of tea during meals impairs iron absorption and thus the incidence of anemia (19). With respect to have food allergy, all pregnant women with anemia hadn't food allergy (100.0%).The majority of pregnant women with anemia ate fruits (51.7%); followed by sometimes have ate fruits (48.3 %). These result agreed with Karaoglu et al.(2010) who suggested consumption of fruit two or more times per week is associated with decreasing risk of anemia (14). The majority of pregnant women with anemia preferred meats (56.7%); while the lowest percentage of sample study preferred fruits (11.6%); followed by fish and vegetables (15.0% and 16.7%) respectively. In the study of Lebso et al., (2017) showed that women who had low dietary diversity score were 3.18 times more likely to develop anemia than those with higher dietary diversity score (16). With regard to walk, the highest percentage of sample study walked (56.7%); followed by sometimes walked (40.0%); while the lowest percentage of sample study wasn't walked (3.3%). The diet of the majority of woman is monotonous and low in vegetables and animal sources ; it is highly dependent on a largely local market system and seasonal availability. In the period before the season, the availability of fruit and vegetables drops dramatically, causing an increase in their prices (2).

Table (5) The characteristics of the food habits of anemic pregnant women

Variable	Study Sample (60)	
	Frequency	**Percent %**
How many meals you eat at a day?		
One Meal	0	0.0
Two Meals	10	16.7
Three Meals	50	83.3
Total	60	100.0
Do you eat breakfast?		
Yes	00	0.00
No	56	93.3
Sometimes	4	6.7
Total	60	100.0
Do you eat snacks?		
Yes	13	21.7
No	6	10.0
Sometimes	41	68.3
Total	60	100.0
Do you eat fried foods?		
Yes	14	23.3
No	13	21.7
Sometimes	33	55.0
Total	60	100.0
Do you eat fatty foods?		
Yes	34	56.7
No	1	1.7
Sometimes	25	41.7
Total	60	100.0
Do you drink milk?		
Yes	4	6.7
No	45	75.0
Sometimes	11	18.3
Total	60	100.0
Do you drink tea?		
Yes	20	33.3
No	19	31.7
Sometimes	21	35.0
Total	60	100.0

Variable	Study Sample (60)	
	Frequency	**Percent %**
Do you have food allergy?		
Yes	0	0.0
No	60	100.0
Total	60	100.0
Do you eat fruits?		
Yes	31	51.7
No	0	0.0
Sometimes	29	48.3
Total	60	100.0
What favorite foods?		
Vegetables	10	16.7
Fruits	7	11.6
Meats	34	56.7
Fish	9	15.0
Starches	0	0.0
Total	60	100.0
Do you walk?		
Yes	34	56.7
No	2	3.3
Sometimes	24	40.0
Total	60	100.0

Table (6) represent the means and standard deviations of nutrients intakes compared with RDI of anemic pregnant women. It could be noticed that calcium, phosphorus, total iron, zinc and magnesium intakes by sample study was lower than recommended dietary intake; but sodium and potassium intake was higher than recommended dietary intake. Generally, all anemic pregnant women were unable to fulfill the Recommended Dietary intake (RDI) for energy, protein, and some micronutrients from food consumption. Pregnant women with anemia had a higher proportion of inadequate nutrient intake than mildly anemic as shown in Table 6.

It could be noticed that vitamin D, vitamin B1, vitamin C, vitamin A, niacin and vitamin B6 intake by sample study was lower than recommended dietary allowances; but vitamin E and vitamin B2 intake was higher than recommended dietary intake.

It could be noticed that water, total protein and fiber intake by sample study was lower than recommended dietary allowances; but total fat and carbohydrate intake was higher than recommended dietary intake. Coexisting nutritional deficiencies could reduce the

potential benefit of a single nutrient supplement in improving nutrition status and morbidity . The role of vitamin deficiencies in the etiology of anemia was described . Specifically, vitamin A, riboflavin, vitamin B-6, vitamin B-12, and folate exert hematopoietic function , suggesting that anemic women should possibly be supplemented not only with iron but also with vitamin A and other micronutrients. However, less is known about metabolic interactions of micronutrients. Zinc may interact with vitamin A to potentiate the effect of vitamin A in restoring night vision among night-blind pregnant women with low initial serum zinc concentrations (10, 23, 1).

Table (6): Means and standard deviations of nutrients intakes of anemic pregnant women compared with DRI

Nutrients intake	Sample study (60)	
	Mean±SD	% DRI
Water	759.90±24.41	75.99
Protein-A	32.16±7.69	
Protein-B	31.40±4.26	
Total Protein	63.62±6.17	89.60
Fat-A	25.59±6.55	
Fat-B	27.06±4.07	
Total Fat	52.80±4.98	91.03
Carbohydrate	216.28±11.73	123.59
Fiber	12.87±2.39	45.96
Calcium	595.18±13.96	59.52
Phosphorus	1115.74±20.48	159.39
Iron-A	4.21±0.96	
Iron-B	11.02±1.32	
Total Iron	15.24±2.12	56.44
Sodium	2655.09±17.38	115.44
Potassium	2004.85±11.57	100.24
Zinc	8.78±1.83	79.82
Magnesium	302.08±11.88	86.31
Vitamin C	35.20±6.52	41.41
Vitamin D	4.04±1.81	80.80
Vitamin A	590.23±21.11	76.65
Vitamin E	19.19±2.574	127.93

Nutrients intake	Sample study (60)	
	Mean±SD	**% DRI**
Vitamin B1	0.89±0.06	63.57
Vitamin B2	1.92±0.053	137.14
Niacin	12.63±1.87	70.16
Vitamin B6	1.19±0.334	62.63

Conclusion

In conclusion, the obtained results showed that pregnant women with anemia suffer from a deficiency of iron intake and hemoglobin. Most of the cases in this study pregnant and did not suffer from any diseases, but a few suffered from high blood pressure. Most of the cases eat two meals and aren't interested in eating fruit and walking and they did not care about breakfast and milk.

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تقييم الحالة الغذائية للسيدات الحوامل المصابات بفقر الدم في مدينة بركة السبع بمحافظة المنوفية – مصر

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قسم التغذية وعلوم الأطعمة، كلية الاقتصاد المنزلي، جامعة المنوفية، شبين الكوم، مصر

الملخص العربي

تم إجراء هذ ه الدراسة لتقييم الحالة التغذوية وقياسات الجسم البشري وتحاليل الدمللحوامل. شاركت في الدراسة 60 امرأة حامل، تراوحت أعمارهن ما بين 19-45 سنة. تم تقييم القياسات الأنثروبومترية والعادات الغذائية وكمية المأخوذ الغذائي والحالة الاجتماعية والاقتصادية. تم جمع عينات الدم لإجراء تحليل صورة دم كاملة و الفيريتين. أظهرت النتائج أن النساء الحوامل المصابات بفقر الدم يعانين من نقص في الهيموجلوبين و الفيريتين. كان مؤشر كتلة الجسم حوالي 28 للحالات محل الدراسة وهذا يشير إلى زيادة الوزن لدى هؤلاء السيدات. معظم الحالات في هذه الدراسة لم تكن تعاني من أي أمراض ، ولكن قلة تعاني من ارتفاع ضغط الدم. معظم الحالات تناولت وجبتين ولم تهتم بوجبة الإفطار والحليب. كان لدى النساء الحوامل نقص في فيتامين د وفيتامين ب 1 وفيتامين ج وفيتامين أ والنياسين وفيتامين ب 6 بالمقارنة بالRDA. لذلك أوصت الدراسة بضرورة الاهتمام بحساب مؤشر كتلة الجسم خلال فترة الحمل وكمية ونوعية المأخوذ الغذائي لتجنب أمراض سوء التغذية مثل فقر الدم.

الكلمات المفتاحية: الحمل ، فقر الدم ، الهيموجلوبين ، العادات الغذائية.