Dietary Practices Linked to Anemia in Pregnant Women

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ABSTRACT

*This study was done to identify dietary factors that contribute to anemia in a sample of pregnant women in Cairo University Hospitals (Al-Qasr Al-Aini). This study was carried out on 200 anemic pregnant women in the first trimester of pregnancy, whose ages ranged from 21 to 25 years old. The participant's nutritional status was evaluated by daily diets and anthropometric measurements. The a**nemic** pregnant women were examined for ferritin, serum iron, and CBC test. The study showed that approximately 70% of pregnant women were overweight. 80% of the cases in this study did not suffer from any diseases, but 5% and 2.5% suffered from high blood pressure and diabetes respectively. 50% of them ate two meals and did not care about breakfast and ate fatty food. The majority of the anemic pregnant women had insufficient intake of protein, fiber, calcium, iron, zinc, vitamin D, vitamin B1, niacin, and vitamin B6 as compared with the RDA. These findings highlight the necessity for good nutritional intake both quantity and quality during pregnancy.*

Keywords: *Pregnant Women- CBC- dietary intake*

INTRODUCTION

Anemia in pregnancy is a significant public health issue and affects an estimated 41.8% of pregnant women globally. Over two billion people suffer from anemia worldwide, though deficiencies in folate, Vitamins B12 and A, hemoglobinopathies, and infectious diseases like malaria, tuberculosis, Human Immunodeficiency Virus (HIV), and parasitic infections are significant contributors to anemia iron deficiency is thought to be the most common cause of anemia during pregnancy, accounting for 75%–95% of cases caused by nutritional deficiencies. The need for iron increases significantly during pregnancy due to physiological changes in the mother's red blood cell mass as well as the needs of the placenta and fetus' development and growth. **(Abriha et al., 2014).** Anemia is described by the World Health Organization (WHO) as "a condition in which the number of red blood cells (RBCs) or their oxygen-carrying capacity is inadequate to meet the physiologic demands in the body, in which the hemoglobin level may vary by age, sex, altitude, smoking." The WHO categorizes anemia in pregnancy into three stages based on hemoglobin **(HB)** values. Anemia can range in intensity from mild (Hb level 9–10.9 g/dl) to moderate (Hb level 7-8.9 g/dl) to severe (Hb level 7–4.5 g/dl). **(WHO,2008)** Anemia in pregnancy can result in hazardous consequences that result in low birth weight, preterm labor, and birth abnormalities, which would increase the number of prenatal deaths. **(Alwan et al., 2015 and Breymann, 2015).** To prevent anemia, pregnant women should consume enough nutrients, with an emphasis on iron. Consume foods rich in iron, such as meat, liver, wheat germ, dried fruits, dark green leafy vegetables, and, Meals rich in vitamin C, such as citrus fruits and fresh, raw vegetables**. (Brazier, 2019; Abrisha et al., (2014).**

Objectives: The main objective of this study was to investigate the nutritional factors that contributed to anemia in a sample of pregnant women.

Study design: Cross section study was employed in this study.

Sample size: The total sample size was 200 anemic pregnant women in the first trimester of pregnancy from Cairo University Hospitals (Al-Qasr Al-Aini). Their ages ranged between 21-25 years. The present study started in April 2021 and ended in October 2021.

Study tools: The tools of this study consisted of structured interviewing questionnaires. This consists of three parts: The first is to elicit the socioeconomic characteristics of pregnant women. The second is to collect daily food intake by using the 24-hour recall method and food frequency questionnaire. The third medical history of the pregnant women being studied is anthropometric measurements and some laboratory investigation.

Socioeconomic data: included information about the age, educational levels, occupation, and income levels of pregnant women **(Park and Park, 1979).** As well as, information about the economic class was determined according to the household assets and income according to **Hussein *et al*. (1993).**

METHODS:

Dietary intake of nutrients: A pre-designed form was used to determine daily food intakes by using a 24-hour dietary recall sheet for seven different days to fulfill the following objectives: Obtaining accurate information about the foods and beverages consumed during the day before by the pregnant woman and calculating the nutritive value of the intakes using food composition tables for Egypt **(National Nutrition Institute, 2006).** To compare the nutritional value of the food consumed with the per capita recommended dietary allowances (RDA) used by the **Food and Nutrition Board (2004)** according to age and physical state. Food habits were collected data about the number of consumed meals, omitted meals, and snacks **(Fouque *et al*., 2007).**

Anthropometric measurement: The anthropometric measurements including weight, height, and body mass index were calculated according to **WHO, (2006).**

Laboratory investigation: Laboratory investigation was one for assurance of iron deficiency anemia in the studied sample. Complete Blood Count (CBC), ferritin, and folic acid were carried out according to the methods of **Dacie and Lewis (1998); Masters *et al.* (2001),** and **Stookey (1970)**. Total Iron Binding Capacity

(TIBC) was determined by means of commercial assay kits (Sigma Diagnostic, St. Louis) according to **Cavill's method (1986).** Serum iron is assessed by atomic absorption spectrophotometry **(Jones et al., 1986)**

Statistical analysis:

SPSS was used to examine the data (version 16). Data were given as means and standard deviations for each variable, and an unpaired student t-test was used to compare the means. **Abo-Allam (2003)** classified significant *P* values as those less than (0.05).

RESULTS AND DISCUSSION

Table (1) summarizes the means of anthropometric measurements of anemic pregnant women. The age, height, and weight average of the sample study age were 23.3 years. 160.21 cm and 80.8 Kg respectively. The BMI mean of the sample study was 31.2/m^2. (Overweight). Anemia in pregnancy has certain correlations with higher BMI. **Ghose et al.,** (**2016)** found that overweight or obese women had higher odds of suffering from anemia than women with normal weight status. While some studies found no significant relationship between anemia and BMI, previous research suggests a link between being underweight and anemia status **(Ugwuja et al., 2015)**

Table (2), data showed the means of laboratory investigation for anemic pregnant women. It could be noticed that the levels of hemoglobin, hematocrit, red blood cells, Mean Corpuscular Volume test (MCV), ferritin, serum folate, and serum iron were low, while the total iron-binding capacity (TIBC) high of these parameters assures Iron Deficiency Anemia (IDA) of the studied group.

The results of **table (3)** represent the means and standard deviation of nutrient intakes compared with RDA. It could be noticed that the mean value of total fat, total protein, fiber intake (52.65, 52.46, and 12.87 respectively), calcium, phosphorus, total iron, zinc, and magnesium intake (595.18, 1115.74, 15.24, 8.70, and 302.08) and also vitamin D, vitamin B1, niacin and vitamin B6 intake were (4.04, 0.89, 12.63 and

1.19) with respect of recommended dietary allowances, but energy, carbohydrate, sodium, potassium intake (2196.09, 378.1, 2655.09 and 2004.85 respectively). The mean of vitamin C, vitamin E, and vitamin B2 intake (78.20, 19.19, and 1.92) respectively were higher than recommended dietary allowances. 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 the 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 **(Fishman et al., 2011; Semba and Bloem, 2012, Allen et al., 2016).**

The findings of the **table (4)** represent the characteristics of social variables of anemic pregnant women. With respect to educational status, half of the anemic pregnant women (50%) had secondary school this result had supportive evidence from the **WHO (2020),** in which the prevalence of anemia was common in low educational levels. Regarding occupation, a higher percentage of the study sample was non-working (65%); followed by working (35%). The majority of anemic pregnant women had private income (65%), followed by a salary (35%). Half of the tested sample has low income (50%). These results agree with **Lebso et al., (2017)** who reported that the socioeconomic status of the family is highly correlated with anemia among pregnant women; Women of the lower socio-economic class had a higher prevalence of anemia than women of higher socio-economic status. Our finding was consistent with **Ivoke et al., (2013),** where a higher prevalence of anemia was reported in lower socioeconomic classes. This could be because lower-income women are unable to purchase both high-quality and sufficient quantities of food with regard to the kind of previous childbirth, it was found that 55% of anemic pregnant women had cesarean childbirth, whereas (35. %) of the sample study had normal childbirth. These results agreed with **Cotta et al., (2011),** who reported 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. As for suffering from diseases during gestation, the majority of the anemic pregnant women (80%) didn't suffer from chronic diseases during gestation, while 20% of the anemic pregnant women suffering from chronic diseases during gestation. These findings are consistent with those of **Banjari et al., (2015) and Zhao et al., (2015),** It was found (80%) of the sample study had no disease, whereas (2.5%) had diabetes.

Table (5) illustrates the characteristics of the food habits of anemic pregnant women. With respect to the number of meals eaten; the highest percentage of anemic pregnant women 65% ate two meals, while 35% ate three meals. These results agreed with **Gebremedhin and Enquselassie (2005),** who reported that pregnant women who had a meal frequency less than two times were at a higher risk of developing anemia. This may be due to the fact that pregnancy is a special period with increased energy and nutrient requirements, the highest percentage of the sample study hadn't eaten breakfast (65%). These results agreed with **Izah (2011),** who reported that breakfast is an important factor before doing any physical activity because breakfast contributes about

25% of the nutritional needs of a day, which is quite significant., Energy is a source of erythrocyte formation, whereas hemoglobin is a part of erythrocytes, **(McLean et al., 2009).** The highest percentage of the sample study ate snacks (55% of Fried food taken by 85%of the participants, and 90% of pregnant women ate fatty foods. These results agree with **Seriki et al. (2017),** who reported that a higher percentage of pregnant women had unhealthy snacks which had a negative impact on both calcium and iron status. We found that about 50% drank milk and 45% drank tea this result agrees with **Milman (2008),** and **Thankachan et al., (2008),** who recorded that a higher percentage of pregnant women drank tea between meals, consuming different types of tea during meals impairs iron absorption and thus the incidence of anemia. WHO recommended the avoidance of tea or other iron-chelating substances. The highest percentage of anemic pregnant women ate starchy foods as their favorite. These results agreed with **Karaoglu et al., (2010), Ozsoylu and Aytekin (2011)** reported that the highest percentage of pregnant women prefer starchy food to fruits and vegetables, which may be a contributing factor to anemia as fruits and vegetables are important sources of different micronutrients as vitamin A, and vitamin C, the deficiency of which leads to iron deficiency due to poor absorption. In the study, the highest percentage of the sample study walked (50%); followed by sometimes walked (35.0%), and 15% walk less than 30 minutes.

The results of **table (6)** showed the characteristics of the health status of the studied women with regard to the kind of previous delivery, it was found that 55% of anemic pregnant women had cesarean childbirth, whereas (35. %) of the sample study delivered naturally. These results agreed with **Cotta et al. (2011),** who reported 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. As for suffering from diseases during gestation, the majority of the anemic pregnant women (80%) didn't suffer from chronic diseases during gestation, while 20% of the anemic pregnant women suffering from chronic diseases during gestation. These findings are consistent with those of **Banjari et al. (2015) and Zhao et al. (2015),** It was found (80%) of the sample study had no disease, whereas (2.5%) had diabetes (12.5) had hypertension and other diseases. This result corresponds to **Paul et al. (2008),** who have demonstrated that poor blood pressure control is associated with decreased hemoglobin concentration and iron absorption.

Table (7) reflects the correlation coefficient between laboratory investigation and social variables. Hemoglobin had a positive correlation with ferritin. A positive correlation was found between red blood cell level and educational status ($P \leq 0.01$). While it was correlated negatively with Job ($P \leq 0.05$). RDW-CV level correlated positively with ferritin and income ($P \leq 0.05$). Platelet count had a positive correlation with Total leucocyte count while the total leucocyte count correlated significantly positively with white cell count ($P \leq 0.01$) and negative correlation with educational Status ($P \leq 0.05$). It can be noticed that positive correlation between educational Status and job ($P \leq 0.001$) also, the same correlation between job, income, and amount of income. Energetic efficiency was affected at all levels of iron deficiency in humans, in the laboratory, and in the field. The reduced work productivity observed in field studies is likely due to anemia and reduced oxygen transport. Poverty, low education, and lack of iron-rich sources in food intake are often regarded as reasons for the poor dietary intake of iron among women in developing nations. Thus, education on iron-rich food intake and iron supplementation compliance should be emphasized for improved maternal iron status. In terms of socioeconomic status, income level, level of education, literacy status, marital status, meal frequency, occupation, place of residence, ethnicity, and religion were found the association with health problems related to nutrition through women of reproductive age. The consequences of having health problems related to nutrition among women of reproductive age are mostly contributing to pregnancy and latency periods. Women of reproductive age with anemia, underweight, or overweight may increase the risk of low-weight birth, premature birth, growth stunted, low store of micronutrients, low blood pressure, and perinatal mortality. Low socio-economic status, low education, discontinued use of iron supplements, low dietary diversity, and helminth infections. Hook-worm infection contributes to anemia as it feeds off its host's blood causing blood loss **(Karaoglu et al., 2010; Lebso et al., 2017).**

The data in **table (8)** showed the correlation coefficients between laboratory investigation and anthropometric measurements. MCV correlated negatively with height, age correlated positively with weight ($P \leq 0.01$) and BMI ($P \leq 0.05$) and finally BMI correlated positively with weight ($P \leq 0.01$). Obesity may disrupt iron homeostasis, resulting in iron deficiency anemia. The association between obesity and iron deficiency may be due to increased hepcidin levels mediated by chronic inflammation. BMI had no correlation with hemoglobin, MCV, serum iron, TIBC, transferrin saturation index, and ferritin. The nutritional status of persons and intake of high-iron foods by obese persons should be considered. The first rationale is that BMI is strongly correlated with weight, but is independent of height. The second rationale is that BMI correctly captures the relationship between weight and height, which implies that the slope of log weight regressed on log height is 2 **(McLean et al., 2009; Ozsoylu and Aytekin, 2011).**

CONCLUSION

Nutrition in pregnancy must give more attention, especially in the case of anemic mothers. Nutrition is one key to a successful pregnancy. The result indicated that pregnant women with anemia had bad eating habits, with low intakes of protein, iron, and folate. Vitamin D and high intakes of food items rich in energy, this funding emphasize the significance that pregnant women should encourage to access a nutritious diet during pregnancy. This encourages both the pregnant woman and her fetus to receive the best nourishment possible during pregnancy. Pregnant women with poor diets frequently struggle to get the nutrients they need to support the fetus's growth and development. Therefore, measures to enhance a pregnant woman's nutritional status can result in a reduction in the prevalence of iron deficiency anemia during pregnancy and related comorbidities.

REFERENCES

Abo-Allam RM (2003): Data statistical analysis using the SPSS program.1st, ed., the publication for Universities, Cairo.

Abraha A; Yesuf ME and Wassie M (2014): Prevalence and associated factors of anemia among pregnant women of Mekelle town: A cross-sectional study. *BMC. Res. Notes*, (9)7:888.

Allen LH and Kerstetter JE (2005): Calcium. In Encyclopedia of Human Nutrition, 2nd ed.; Allen, L., Prentice, A., Eds.; Elsevier Ltd.: *Amsterdam, The Netherlands*, 253 –259.

Alwan NA; Cade JE; McArdle HJ; Greenwood DC; Hayes HE and Simpson NA (2015):
Maternal iron status in early pregnancy and birth outcomes: insights from Baby's Vascular health and Iron in Pregnancy study. *British Journal of Nutrition*, 113(12): 1985-1992.

Banjari I.; Kenjeric D; Mandic ML; Glavas M and Leko J (2015):
Longitudinal observational study on diet quality during pregnancy and its relation to several risk factors for pregnancy complications and outcomes. *British Journal of Medicine and Medical Research,* 7(2).

Brazier Y (2019):
Healthline Media UK Ltd, Brighton, UK, a Red Ventures Company.

Breymann C (2015):
Iron deficiency anemia in pregnancy. In Seminars in hematology, 52, (4): 339-347.

Cavill I; Jacobs A and Worwood M (1986):
Diagnostic methods for iron status. *Annu. Clin. Biochem.,* 23: 168.

Cotta RMM; Oliveira FDCC; Magalhães KA; Ribeiro AQ; Sant'Ana LFDR; Priore SE and Franceschini SDCC (2011):
Social and biological determinants of iron deficiency anemia. *Cadernos de SaúdePública*, 27: s309-s320.

Dacie A and Lewis J (1998):
Practical Hematology. Churchill Livingstone. *New York, USA*.

Dani C; Rossetto S; Castro SM and Wagner SC (2008):
Prevalência da anemia e deficiênci as nutricionais, através de different esparâmetros laboratoriais, emmulheres grávi dasatendidasemdoisservi ços de saúdepública no *Rio Grande do Sul*. *RBAC*, 40(3): 171-75.

de Sá SA; Willner E; Pereira TAD; de Souza VR; Boaventura GT and de Azeredo VB (2015): Anemia in pregnancy: impact on weight and in the development of anemia in newborns. *Nutrition hospital aria*, 32(5): 2071-2079.

Food Composition Table (2006): National Nutrition Institute, Cairo, Egypt.

Food and Nutrition Board (1997): Dietary References Intake for Calcium, Phosphorus, Magnesium, Vitamin D and Fluoride, DC., *National Academy Press*.

Gebremedhin S and Enquselassie F (2005): Correlates of anemia among women of reproductive age in Ethiopia: evidence from Ethiopian DHS. Ethiopian J. Health Dev., 25(1):22–30.

Ghose B; Tang S; Yaya S and Feng Z (**2016**): Association between food insecurity and anemia among women of reproductive age. *Peer. J*., 4: e1945.

Hussein MA; Hassan HA and Noor EF (1993): National Food Consumption Study, Final Report, *Nutrition Institute. Ministry of Health, Cairo.*

Ivoke N; Eyo JE; Ivoke ON; Nwani CD; Odii EC; Asogwa CN and Atama CI (2013): Anemia Prevalence and Associated Factors among Women Attending Antenatal Clinics in South-Western Ebonyi State, Nigeria.

Izah NS (2011): Faktor - Faktor yang Berhubungandengan Status Anemia Deficiency Besi Anak Sekolah Kelas V dan VI MI Negeri 02 Cempaka Putih Ciputat Timur

Tangerang Selatan. Skripsi.

Jones G; Kooh SW and Radde IC (1986):
Iron metabolism, in Textbook of Clinical Chemistry, Tiez, N. W. Ed. *Saunders, Philadephia.* The USA.

Karaoglu L; Pehlivan E; Egri M; Deprem C; Gunes G; Genc MF and Temel I (2010):
The prevalence of nutritional anemia in pregnancy in an east Anatolian province, Turkey. *BMC public health*, 10(1):1-12.

Lebso M; Anato A and Loha E (2017):
Prevalence of anemia and associated factors among pregnant women in Southern Ethiopia: A community-based cross-sectional study. *PloS one*, 12(12): e0188783.

Masters BR; Chance B and Powner AR (**2001**):
Redox confocal imagining intrinsic fluorescent and Luminescent probes for biological activity: Real-time analysis, *London, Academic Press.* 48: 567 – 571.

McLean E; Cogswell M; Egli I; Wojdyla D and De Benoist B (2009):
Worldwide prevalence of anemia, WHO vitamin and mineral nutrition information system, 1993–2005. *Public health nutrition*, 12(4): 444-454.

Milman N (2008):
Prepartum anemia: prevention and treatment. *Annals of hematology*, 87(12): 949-959.

Nordisk R (2005):
Nordic Nutrition Recommendations 2004: Integrating nutrition and physical activity. *Nordic Council of Ministers*.

Okeke UP (**2011**):
Anemia in pregnancy is a persistent public health problem in Porto-Novo

Cape Verde. *Journal of Medical Sciences*,5(4):193-199.

Osungbade KO and Oladunjoye AO (**2012**): Preventive treatments of iron deficiency anemia in pregnancy: a review of their effectiveness and implications for health system strengthening. *J. Pregnancy*,3(9):234-242.

Ouédraogo S; Koura GK; Accrombessi MM; Bodeau-Livinec F and Massougbodji A (**2012**): Cot M. Maternal anemia at first antenatal visit: prevalence and risk factors in a malaria-endemic area in Benin. *Am.J.Trop.Med.Hyg*., 87(3): 418-424.

Özsoylu Ş and Aytekin MN (2011): Vitamin D deficiency and anemia. *Annals of hematology*, 90(6): 737-737.

Paul B; Wilfred NC; Woodman R and DePasquale C (2008): Prevalence and correlates of anemia in essential hypertension. *Clinical and experimental Pharmacology and Physiology*, 35(12): 1461-1464.

Qin Y; Melse-Boonstra A; Pan X; Yuan B; Dai Y; Zhao J and Shi Z (**2013**): Anemia in relation to body mass index and waist circumference among Chinese women. *Nutrition journal*, 12 (1): 1-3.

Seriki SA; Adebayo OF and Odetola AO (2017): Iron: From Dietary Sources to Utilization in the Body. *Glob J. Nanomed*, 3(3): 1-7.

Shankar P; Boylan M and Sriram K (2010): Micronutrient deficiencies after bariatric surgery. *Nutrition*, 26: 1031–1037.

Stookey LL (1970): Determination of serum iron. *Anal. Chem. Bio*.,92: 779 – 781.

Subarnalata S and Basmati PA (2006): Study of nutritional status of pregnant women of some villages in Balasore district, Orissa. *J.Hum.Ecol.*, 20(3): 227-232.

Thankachan P; Walczyk T; Muthayya S; Kurpad AV and Hurrell RF (2008): Iron absorption in young Indian women: the interaction of iron status with the influence of tea and ascorbic acid. The American *journal of clinical nutrition*, 87(4): 881-886.

Ugwuja EI; Ogbonnaya LU; Obuna AJ; Awelegbe F and Uro-Chukwu H (2015): Anemia in relation to body mass index (BMI) and socio-demographic characteristics in adult Nigerians in Ebonyi state. *Journal of clinical and diagnostic research: JCDR*, 9(1): LC04.

WHO, World Health Organization, (2004): The World health report: Changing history. World Health Organization.

WHO, World Health Organization (2008): WHO guidelines for safe surgery. Geneva, World Health Organization.

WHO, World Health Organization (2018): Serum Ferritin Concentrations for the Assessment of Iron Status and Iron Deficiency in Populations. Available online.

WHO, World Health Organization (2020): http://www.who.int/nutrition/topics/ida/en/

Zhao L; Zhang X; Shen Y; Fang X; Wang Y and Wang F (2015): Obesity and iron deficiency: A quantitative meta-analysis. *Obesity* Reviews, 16(12): 1081-1093.

Table (1): The mean of anthropometric measurements of anemic pregnant women

Anthropometric measurements	Study Sample (200)
	Mean ± SD
Age (years)	23.0±3.31
Height (c.m)	160.21±5.46
Weight (Kg)	80.08±9.76
BMI (Kg/m^2)	31.28±2.30

Table (2): The mean of laboratory investigation for anemic pregnant women

Laboratory Investigation	Mean of Normal range	Study Sample (200) Means ± SD	% of normal mean
Hemoglobin (g/dl)	12– 15 (13.5)	9.36±1.458 ↓	69.33
Hematocrit (%)	35 – 55(45)	32.50±5.868 ↓	72.22
Red blood cells10e/mm3)	4 – 6.2(5.1)	4.85±3.666	95.1
MCV (um3)	80 – 100(90)	78.62±8.459 ↓	87.56
MCH (pg)	29– 35(32)	31.28±32.016	97.27
MCHC (g/dl)	31 – 35(33)	31.26±4.417	94.73
RDW-CV (%)	11.5-14.8(13.15)	14.26±7.033 ↑	108.44
Platelets count (10e3/mm3)	150 – 450(300)	231.97±85.980	77.32
Total leucocytic count (cell/microliter)	4-11(7.6)	11.20±4.796	146.36
White cells count (10e3/mm3)	4 – 11(7.6)	11.13±4.810	147.37
Ferritin (mcg / L)	50-125(87.5)	9.42±3.444 ↓	10.77
Serum folate nmol/L	4.5-22.5(13.5)	6.75	50
Total iron-binding capacity (TIBC) micromole/L	42.96 to 70.55 (56.76)	81.55 ↑	143.68
Serum iron (mcg/dL)	65-160(112.5)	60.11 ± 4.55 ↓	53.43

Table (3): Nutritive values of food Consumed by the studied sample (Mean± SD)

Nutrients intake	Sample study (200)	
	Mean ± SD	% RDA
Energy (kcal per day)	2196.09 ±12.54	104.58
*Animal protein (g)	32.06±7.61	80.15
*Plant protein(g)	20.40±5.26	102.0
Total Protein(g)	52.46±6.11	87.43
*Animal fat(g)	25.59±6.52	127.95
*Plant fat(g)	27.06±6.74	67.65
Total fat(g)	52.65±9.80	80.002
Carbohydrate(g)	378.1±9.5	168.04
Fiber(g)	12.87±3.97	58.50
Calcium(mg)	595.18±16.92	59.52
Phosphorus(mg)	1115.74±17.42	85.96
*Animal iron(mg)	4.21±2.66	17.54
*Plant iron(mg)	11.02±1.33	34.38
Total Iron(mg)	15.24±2.19	51.82
Sodium(mg)	2655.09±47.86	115.44
Potassium(mg)	2004.85±11.58	100.24
Zinc(mg)	8.70±3.89	58.00
Magnesium(mg)	302.08±7.08	86.31
Vitamin C (mg)	78.20±6.58	111.71
Vitamin D (mcg)	4.04± 2.81	80.80
Vitamin E (mg.)	19.19±8.74	127.93
Vitamin B1 (mg)	0.89±0.38	55.63
Vitamin B2(mg)	1.92±0.03	106.67
Niacin(mg)	12.63±2.06	90.21
Vitamin B6(mg)	1.19±0.504	62.63

**The percentage of animal or plant sources calculated from the ideal level for everyone, not from the total.*

Table (4): The characteristics of social variables for anemic women

Variable	Study Sample (200)	
	Frequency	Percent %
Educational status		
Secondary school	100	50.0
B. Sc	50	25.0
Master	30	15.0
Doctor of Philosophy	20	10.0
Total	200	100.0
Job		
Work	70	35.0
No Work	130	65.0
Total	200	100.0
Income		
Salary	70	35.0
Other (private income)	130	65.0
Total	200	100.0
Amount of income		
More than 3000	25	12.5
Less than 3000 to 2000	75	37.5
Less than 2000	100	50

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

Variable	Study Sample (200)	%From total
How many meals do you eat daily?		
One Meal	30	15.0
Two Meals	100	50.0
Three Meals	70	35.0
Do you eat breakfast?		
Yes	70	35.0
No	130	65.0
Do you eat snacks?		
Yes	110	55.0
No	70	35.0
Sometimes	20	15.0
Do you eat fried foods?		
Yes	170	85.0
No	20	10.0
Sometimes	10	5.0
Do you eat fatty foods?		
Yes	180	90.0
No	10	5.0
Sometimes	10	5.0
Do you drink milk?		
Yes	100	50
No	50	25.0
Sometimes	50	25.0

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Do you drink tea?		
Yes	90	45.0
No	40	20.0
Sometimes	70	35.0
Do you have a food allergy?		
Yes	15	7.5
No	185	92.5
What favorite foods?		
Vegetables	50	25.0
Fruits	40	20.0
Meats	30	15.0
Fish	10	5.0
Starches	70	35.0
Do you walk for more than 30 minutes?		
Yes	100	50.0
No	70	35.0
Sometimes	30	15.0

Table (6): The characteristics of the health status of an anemic pregnant

Variable	Study Sample (200)	% From total
What kind of previous delivery?		
No previous gestation	70	35.0
Naturally delivery	20	10.0
Caesarean	110	55.0
Total	200	100.0
Did you suffer from diseases during gestation?		
Yes	40	20.0
No	160	80.0
Total	200	100.0
What kind of disease?		
No disease	160	80
Diabetes	5	2.5
Hypertension	10	5
Others	25	12.5
Total	200	100.0

Table (7): Correlation co-efficient between laboratory investigation and anthropometric measurements for anemic women

Variable	Hemoglobin	Hematocrit	Red blood cells	MCV	MCH	MCHC	RDW-CV	Platelets count	Total leucocyte count	White cells count	Ferritin	Age	Height	weight	BMI
Hemoglobin	-														
Hematocrit	-0.046	-													
Red blood cells	0.228	-0.049	-												
MCV	-0.137	0.128	-0.171	-											
MCH	-0.210	0.188	-0.019	0.198	-										
MCHC	0.001	0.436***	0.019	-0.224	-0.048	-									
RDW-CV	0.057	0.018	0.042	-0.196	0.031	0.122	-								
Platelets count	0.009	-0.065	-0.032	0.114	-0.086	-0.138	-0.106	-							
Total leucocyte count	0.005	-0,123	-0.106	0.044	0.023	0.117	-0.214	0.292*	-						
White cells count	0.019	-0.130	-0.105	0.047	0.026	0.126	-0.217	0.297	0.993***	-					
Ferritin	0.672***	0.149	-0.010	-0.088	-0.024	0.132	0.345**	0.011	-0.081	-0.076	-				
Age	0.105	0.220	0.091	-0.17	-0.092	-0.012	0.245	0.124	-0.090	-.110	0.080	-			
Height	0.004	-0.009	0.040	-0.284*	-0.010	0.028	-0.124	0.170	0.068	0.071	-0.034	0.114	-		
Weight	-0.102	-0.013	-0.037	-0.056	-0.033	0.006	0.015	0.079	0.034	0.044	0.005	0.348**	0.239	-	
BMI	-0.019	-0.030	-0.053	-0.040	-0.041	0.012	0.078	0.079	0.000	0.008	0.049	0.320*	0.048	0.887***	-

** P ≤ 0.05 ** P≤ 0.01 *** P ≤ 0.001*

Table (8): Correlation coefficient between laboratory investigation and anthropometric measurements for anemic women.

Variable	Hemoglobin	Hematocrit	Red blood cells	MCV	MCH	MCHC	RDW-CV	Platelets count	Total leucocyti count	White cells count	Ferritin	Age	Height	weight	BMI
Hemoglobin	-														
Haematocirt	-0.046	-													
Red blood cells	0.228	-0.049	-												
MCV	-0.137	0.128	-0.171	-											
MCH	-0.210	0.188	-0.019	0.198	-										
MCHC	0.001	0.436***	0.019	-0.224	-0.048	-									
RDW-CV	0.057	0.018	0.042	-0.196	0.031	0.122	-								
Platelets count	0.009	-0.065	-0.032	0.114	-0.086	-0.138	-0.106	-							
Total leucocyti count	0.005	-0,123	-0.106	0.044	0.023	0.117	-0.214	0.292*	-						

* P ≤ 0.05 ** P≤ 0.01 *** P ≤ 0.001

الممارسات الغذائية المرتبطة بفقر الدم عند النساء الحوامل

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الملخص العربي

أجريت هذه الدراسة للتعرف على العوامل الغذائية التي تساهم في الإصابة بفقر الدم لدى عينة من الحوامل المترددات علي مستشفيات جامعه القاهره (القصر العيني). إجمالاً ، شاركت 200 امرأة حامل مصابة بفقر الدم الناتج عن نقص الحديد في الدم في الأشهر الثلاثة الأولى من الحمل ، تتراوح أعمارهن بين 21 و 25 عامًا . في هذه الدراسة تم تقييم الحالة التغذوية للمشاركات باستخدام طرق القياسات الغذائية والقياسات الجسميه ، تم عمل تحليل مكونات الحديد الكامله في الدم للنساء الحوامل المصابات بفقر الدم أظهرت انخفاض مستوي الفيريتين، الحديد في الدم ، وكذلك مستوي الهيموجلوبين ، اوضحت الدراسه ان ما يقرب من 80٪ من النساء الحوامل زائدات الوزن ، ومعظم المشاركات لم يكن لديهن أمراض مزمنة. غالبية النساء الحوامل المصابات بفقر الدم لم يكن يتناولن كمية كافية من البروتين والألياف والكالسيوم والحديد والزنك وفيتامين د وفيتامين ب 1 والنياسين وفيتامين ب 6 بالمقارنة مع التوصيات الدوليه. تسلط هذه النتائج الضوء على أهمية المأخوذ الغذائي الجيد من حيث الكم والنوع أثناء الحمل.

الكلمات المفتاحية: الحوامل ، النساء ، صورة الدم ، المتناول الغذائي