

“Assessment of Personal’s Awareness Toward the Nutrition and its Relationship with the Hemoglobin, in Najran Region, Saudi Arabia 2023”

Researchers:

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Abstract:

Nutrition is an important process in which the body's adoption of important nutrients to builds the body and maintains good health and integrity. Nutrition is a powerful major factor in promoting health and improving quality of life. Nutrition is an essential source of iron, which helps hemoglobin to carry out its function. Hemoglobin is one of the most important proteins and plays a major role in transporting oxygen within the body. Malnutrition or insufficient intake of iron may cause a deficiency of iron stores, which may negatively affect the level and function of hemoglobin. There are many factors that may affect hemoglobin, and they may be nutritional or non-nutritive factors, including smoking. The aim of our study is to assessment of personal's awareness toward the nutrition and its relationship with the hemoglobin, in Najran, Kingdom of Saudi Arabia. The study includes 100 samples, venous blood samples. Hematology CBC analysis was done for the blood samples. From the results, we found that there is an effect on the hemoglobin level due to several factors, including dietary factors such as meat and non-dietary factors such as smoking and body mass. In addition, we found that the awareness rate of the participants was very high for their knowledge of the importance of nutrition and the benefits of iron and its relationship with the level of hemoglobin. Health education should be carried out in educational organizations to guide people to make nutritional plans to improve the quality of life for the better.

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Table of abbreviation

Abbreviation	The meaning
RBCs	Red blood cells
CO₂	Carbon dioxide
Hb	Hemoglobin
MCV	Mean corpuscular volume
MCH	Mean corpuscular hemoglobin
PCV	Packed cell volume
CBC	Complete blood count

ACKNOWLEDGEMENT

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INTRODUCTION

Nutrition is described as an important process with a great role to maintain the functional and structural integrity of the body through which cellular organelles, cells, tissues, organs, and all parts of the body can obtain and utilize the necessary substances from foods [1]. It is important to know the type of food we eat because food is very important in providing us with nutrients. The quality of life and health is highly dependent on nutrition to maintain health and provide fitness for the body. Food is a necessity of life for a person to be able to live, and it is a basic source in providing energy, growth, and repairing damaged tissues and organs of the body. It also regulates body functions and protects from diseases.

Nutrients are components in food that must be supplied in adequate quantities to the body. It includes many compounds such as carbohydrates, fats, proteins, vitamins, minerals, fiber, and water.

It can be divided into two parts Micro-nutrients and Macro-nutrients [2].

Class/category	Subclass/category	Nutrient examples
Carbohydrates (macronutrients)	Monosaccharides	Glucose, fructose, galactose
	Disaccharides	Sucrose, maltose, lactose
	Polysaccharides	Starch and dietary fiber
Proteins (macronutrients)	Plant and animal source proteins	Amino acids ($n = 20$): aliphatic, aromatic, sulfur-containing, acidic, basic
Fats and oils (lipids) (macronutrients)	Saturated fatty acids	Palmitic and stearic acid
	Monounsaturated fatty acids	Oleic (<i>cis</i>) and elaidic (<i>trans</i>) fatty acids
	Polyunsaturated fatty acids (n-3, n-6, n-9)	Linoleic, α -linolenic, arachidonic, eicosapentaenoic, docosahexaenoic acid
Minerals (micronutrients)	Minerals and electrolytes	Calcium, sodium, phosphate, potassium, iron, zinc, selenium, copper, manganese, molybdenum, fluoride, chromium
	Trace elements	
Vitamins (micronutrients)	Fat soluble	Retinol (A), calciferols (D), tocopherols (E), vitamin K
	Water soluble	Ascorbic acid (C), thiamine (B_1), riboflavin (B_2), niacin (B_3), pyridoxine (B_6), folate, cobalamin (B_{12})
Water	Water	Water

Figure (1): The most essential human nutrition Classes [1].

The essential micronutrients for all stages of the life span that we get from food are many vitamins and minerals and have a major role in serving blood function. Vitamin B12 (cobalamin) and folic acid (folate) have an essential function in the formation of new blood cells. There are minerals and vitamins associated with hemoglobin, such as iron, copper, zinc, and vitamin B6 [3].

1.1. Dietary iron

The diet contains heme and non-heme iron. Heme iron is found in meat, poultry, and fish in the form of hemoglobin or myoglobin. Vegetable diets usually contain the most non-heme iron and it may be present in the form of ferritin or hemosiderin in the spleen, liver, and bone marrow [4].

Diets that contain meat have dietary iron predominantly non-heme iron and a small amount of iron in form of heme iron about 5-10%. Although heme iron constitutes the smallest part, it is highly bioavailable and absorbed by 20-30%, unlike non-heme iron, it is affected by other factors and its absorption is approximately 1-10% less than heme iron. Ferric iron (Fe^{3+}) is the predominant iron found in the environment and the diet and it is insoluble iron so not bioavailable. It must reduce the non-heme iron from ferric (Fe^{3+}) to ferrous (Fe^{2+}) iron before absorbance of it. Ascorbic acid and reducing agents such as duodenal cytochrome B (dcytB) work to the reduction of ferric (Fe^{3+}) iron [5].

1.2. Vegetarian diets

lack meat and food sources that provide iron in adequate quantities for the body, and this system mostly depends on eating grains, vegetables, fruits, legumes, and nuts [2].

The ability of the human body to survive is limited and linked to many factors. The body can survive three weeks without any food, three days without water, but the body can't survive more than three minutes without oxygen reaching it [6].

1.3. The RBCs formation and The Hemoglobin function

Hematopoiesis is the process that responsible in the adult for blood cells production and maturation, the process occurs in bone marrow primarily. The pluripotential hematopoietic stem cell –multipotent progenitor- is the most important cell from which the process of blood formation begins and is responsible and capable of proliferation, replication, and differentiation to all types of blood cells. The pluripotential hematopoietic stem cell response to cytokines for differentiation into common myeloid progenitor will result in the production of Granulocyte, monocyte, erythrocyte, and lineages of megakaryocyte. In addition, differentiating into common lymphoid progenitors will result in the production of T, B, and natural killer cells [7].

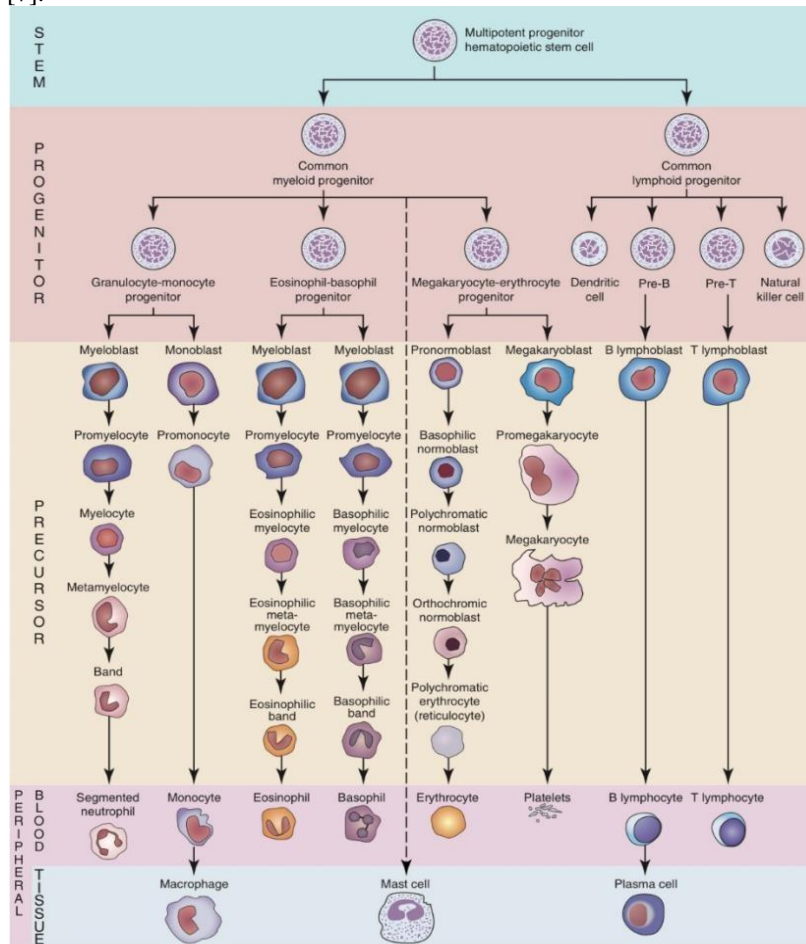


Figure (2) 1.3: Chart of hematopoiesis [7].

The production of RBCs by a process called erythropoiesis which regulation by the erythropoietin hormone that is produced by the kidney in response to its oxygen supply. The main function of RBCs is to transport the O_2 to the tissue and return CO_2 from the tissue to the lung. This process exchanging of the gaseous depends on specialized protein inside the RBCs called Hbs (Hemoglobin). The hemoglobin protein consists of two parts the first one is haem and the other is

globin. The heam contains iron and protoporphyrin. Iron deficiency reflects its effect on hemoglobin, resulting in what is called iron deficiency anemia. Hypochromic anemia is caused by a lack of iron, this results in pale RBCs. In addition, microcytic anemia according to the size of red cells is smaller than normal RBCs. The diagnosis of the anemia Depends on RBC indices MCV and MCH to assess and determine the type of anemia and another test such as PCV, Hbs, and RBCs count that fall under CBC test [8].

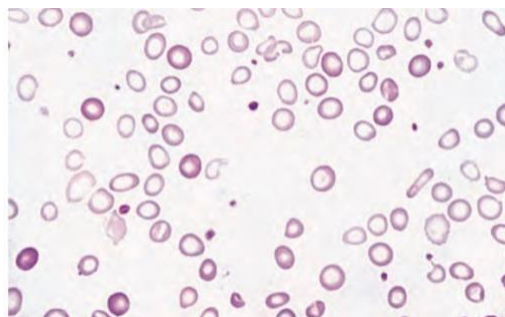


Figure (3) 1.3: The blood film shows hypochromic and microcytic cells caused by decrease dietary iron supplies [8].

Table 2.3 Normal adult red cell values.		
	Male	Female
Haemoglobin (g/dL)	13.5–17.5	11.5–15.5
Haematocrit (PCV) (%)	40–52	36–48
Red cell count ($\times 10^{12}/L$)	4.5–6.5	3.9–5.6
Mean cell haemoglobin (MCH) (pg)	27–34	
Mean cell volume (MCV) (fL)	80–95	
Mean cell haemoglobin concentration (g/dL)	30–35	
Reticulocyte count ($\times 10^9/L$)	50–150	

Figure (4) 1.3: The normal range of hemoglobin and RBC indices [8].

1.4. Iron regulation

Hepcidin is a hormone produced by liver cells that play a role in regulating iron homeostasis. Increasing iron levels in excessive amounts in plasma or increasing storage stimulate the production of the hepcidin hormone by the liver to inhibit the absorption of iron from the diet. In addition, a decrease in the hepcidin hormone allows the absorption of iron [9].

1.5. Iron distribution in the body

Iron is distributed in the body by 60% in hemoglobin, 5% in myoglobin, and 5% in the various enzymes that contain iron. The excess iron is accounted through the capacity compartment that consists of 20% ferritin, 10% haemosiderin, and an amount less than 0.1% in the circulation bound to transferrin [10].

1.6. Iron gain and loss

Iron is an important and essential metal for the body. Our bodies lose amounts of iron daily through processes such as sweating, urination, defecation, hair loss, and sloughing off skin cells. Bleeding is one of the main causes of iron loss in large quantities. The menstrual cycle is one of the reasons in women that makes women more susceptible to anemia caused by iron loss. To compensate for the amounts of iron that are lost from the body and to maintain an adequate supply of iron, a person should consume approximately 18 mg of iron per day. Red meat, liver, egg yolk, fortified cereals, beans, and nuts are good food sources that are rich in iron [11].

1.7. Dietary factors decrease the absorption of iron

1.7.1. Calcium

Calcium is a mineral that has a role in inhibiting iron absorption whether heme iron or non-heme iron. Iron absorption may be inhibited by calcium after iron is freed from the porphyrin ring. It has been shown that calcium inhibits iron absorption in both rodents and men. Revealed that giving 165 mg Ca as milk, cheese or calcium chloride diminished iron absorption by 50-60% in a single meal [12].

1.7.2. Phytate

The phytate molecule can be negatively charged, which has the ability to bind with positive metals such as iron. researched the probability to long term utilization of high bran containing phytate diet could incite changes in the digestive tract, which would achieve a bring about an adaptation to the inhibitory impacts of phytate on the intestine iron absorption [12].

1.7.3. Phenolic Compounds

Food or beverages containing phenolic compounds may bind with iron Fe during digestion in the intestinal lumen, making it difficult to absorb iron. Most drinks reduce iron absorption, depending on the amount of polyphenols. The highest rate of inhibition of iron absorption in black tea was 79–94%. A few studies have revealed that the amount of 20 mg of polyphenols in black tea can reduce iron absorption by 66% per meal. Consuming drinking large amounts of black tea and coffee has a strong effect in inhibiting iron absorption from composite meals, and coffee may contain half the effect of black tea in inhibiting [12].

1.8. Dietary factors increase the absorption of iron

1.8.1. Ascorbic acid (Vitamin C)

Ascorbic acid is the most effective factor that helps to stimulate the absorption of iron from the meal, especially non-heme iron because it is difficult to absorb and its action is to reduce ferric iron (Fe³⁺) to ferrous (Fe²⁺) iron states and its second function to prevent the formation of insoluble and bounded iron compounds.

When a person drinks a glass of orange juice with breakfast, it has been observed that it increases the rate of iron absorption by 2.5 times [12].

1.8.2. Meat

Heme iron is affected by its absorption from nutritional compounds in the diet, except for meat, which stimulates iron absorption. In addition, meat increases the absorption of non-heme iron. Meat may enhance the absorption of non-heme iron by stimulating the production of gastric acid. In addition, poultry and fish have a stimulating effect on the absorption of non-heme iron [12].

1.8.3. Alcohol

Alcohol increases non-heme iron in small amounts in men. A comparison has shown that people who drink alcohol chronically have an increase in the concentration of ferritin in the serum compared with nondrinkers [12].

<p>Haem iron absorption</p> <ul style="list-style-type: none"> • Amount of haem iron present in meat (high haem iron content boost iron absorption) • Content of calcium in meal (high calcium content reduce iron absorption) • Food preparation (time, temperature): may cause leaching of haem iron <p>Nonhaem iron absorption</p> <ul style="list-style-type: none"> • Iron status of the individuals • Amount of bioavailable nonhaem iron • Balance between dietary factors enhancing and inhibiting iron absorption <p>Factors enhancing iron absorption</p> <ul style="list-style-type: none"> • Ascorbic acid • Meat, fish and seafoods • Certain organic acids (citric, lactic, malic, tartaric) <p>Factors inhibiting iron absorption</p> <ul style="list-style-type: none"> • Presence of anti-nutrients (example phytates and tannin) in cereal based food products • Iron binding phenolic compounds in tea, coffee, red wine, some leafy vegetables, herbs, nuts and legumes • Calcium • Soy protein <p>Source: Hallberg & Hulthen, 2000.</p>

Figure (5) 1.8.3: Dietary and non-dietary factors affecting iron absorption [12].

1.9. Effect of decrease of iron

Iron deficiency is one of the problems that affect hemoglobin, resulting in iron deficiency anemia, and it is one of the most severe and most important cases of nutritional deficiency in the world now. Iron deficiency may cause cognitive impairment in children up to adolescence and it causes increases in morbidity rates and causes damage to immune mechanisms [13].

1.10. The effect of smoking on hemoglobin

It is known that smoking is one of the reasons that affect hemoglobinuria by increasing its concentration [14].

Therefore, the aim of our study is to assessment of personal's awareness toward the nutrition and its relationship with the hemoglobin, in Najran, Kingdom of Saudi Arabia.

Objectives

2.1. Objectives

1. Assessment of personal's awareness toward the nutrition and its relationship with the Hemoglobin, in Najran, Kingdom of Saudi Arabia.
2. Identify nutritional and non-nutritive factors and their impact on hemoglobin level.

MATERIAL AND METHOD

3.1. Materials

- We collected data by using questionnaires and distributing them to people who wanted to have a CBC blood test or measure hemoglobin level in King Khalid Hospital and Najran University Hospital.
- We Used the Microsoft excel 2016 program for data analysis.

3.2. Method

- We collected 40 data using questionnaires from King Khalid Hospital for patients who did a CBC blood test, and they included 32 males and 8 females. In addition, we have collected 60 data from Najran University Hospital, including 42 males and 18 females.
- After completing the data collection, we entered the hemoglobin rate, general information, and answers to the questions in the questionnaire for all participants into Microsoft Excel 2016 program.
- Then we performed a statistical analysis using columns and pie charts.

RESULTS

4.1. Demographic information

The charts below describe the demographic information of the participants in this study. These charts shows that the percentage of samples had collected in the king Khaled hospital (KKH) was just 40% (40/100) of 100 samples and the percentage of samples had collected in the Najran university hospital (NUH) was just 60% (60/100) of 100 samples. Of the general number of samples, 74% (74/100) samples had collected from males and 26% (26/100) samples had collected from females.

Considering the ages of those who participated in the study, 70% (70/100) of the age ranged from 1-29 years, 23% (23/100) were from 30-39 years old, and 7% (7/100) were from 40-49 years old.

When looking at the job status, we found that the percentage of those who work is 41% (41/100), the percentage of students is also 41% (41/100), and the percentage of those who do not work is 18% (18/100).

It also showed that the percentage of those who did not study was 3% (3/100) while the percentage of students in general education was only 7% (7/100). Participants who obtained a diploma were 37% (37/100) and the percentage of Participants at the bachelor's level and above was 53% (53/100).

The percentage of non-smokers in this study was 71% (71/100), cigarette smokers were 18% (18/100), and Hookah smokers were 7% (7/100). Participants who used both cigarettes and Hookah was 4% (4/100).

In terms of body mass index, this study showed that participants whose was less than

18.5 was 7% (7/100), while 40% (40/100) of participants was in the normal range from 18.5-24.9, and 53% (53/100) of people found that their body mass was higher than 24.9 the normal level.

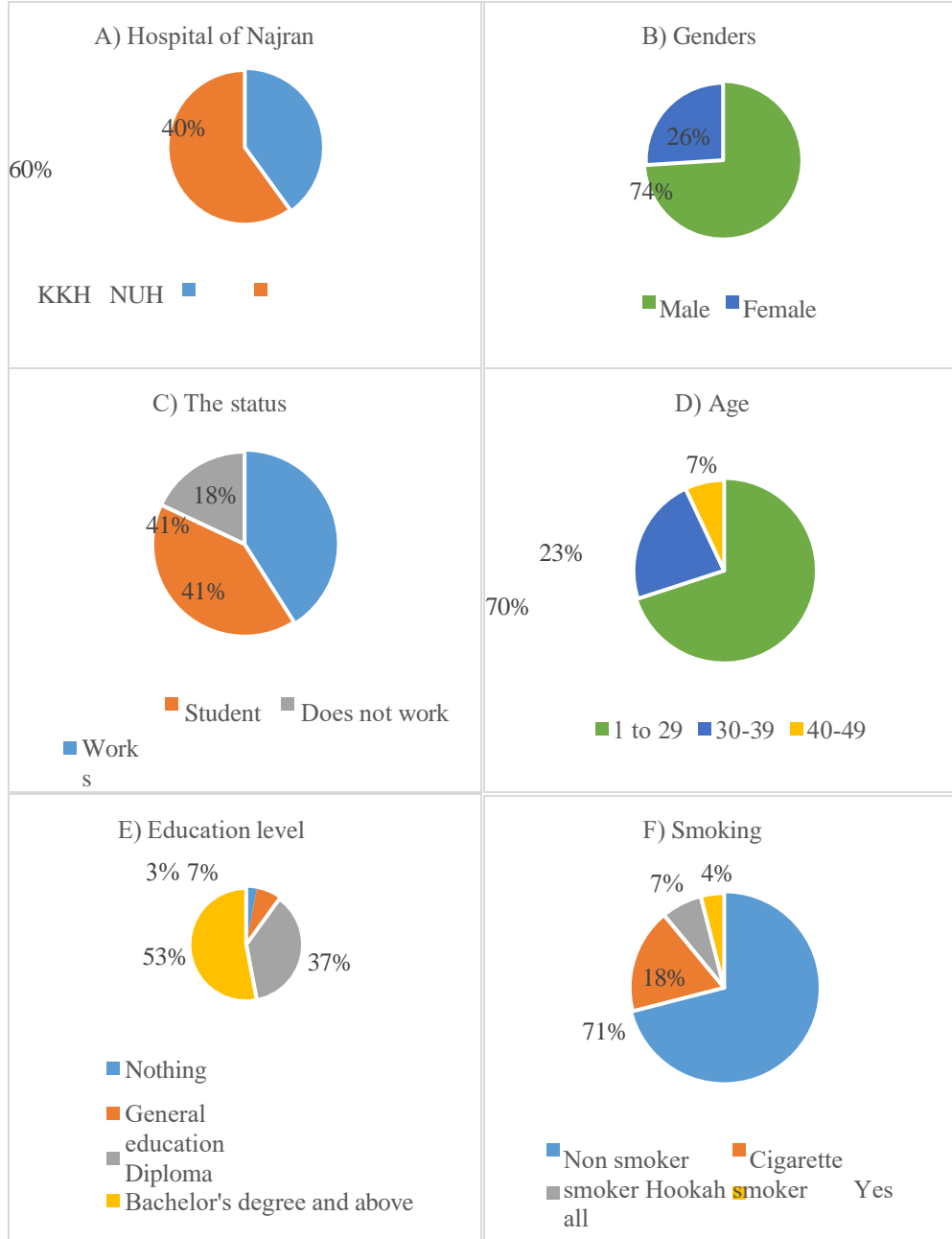
Males, whose hemoglobin percentage is less than 13.5, representing 5.40% (4/74), those in the normal range of 13.5-17.5 represent 89.18% (66/74), and those whose hemoglobin levels is more than 17.5, represent 5.40% (4/74) of the total male participated in this study.

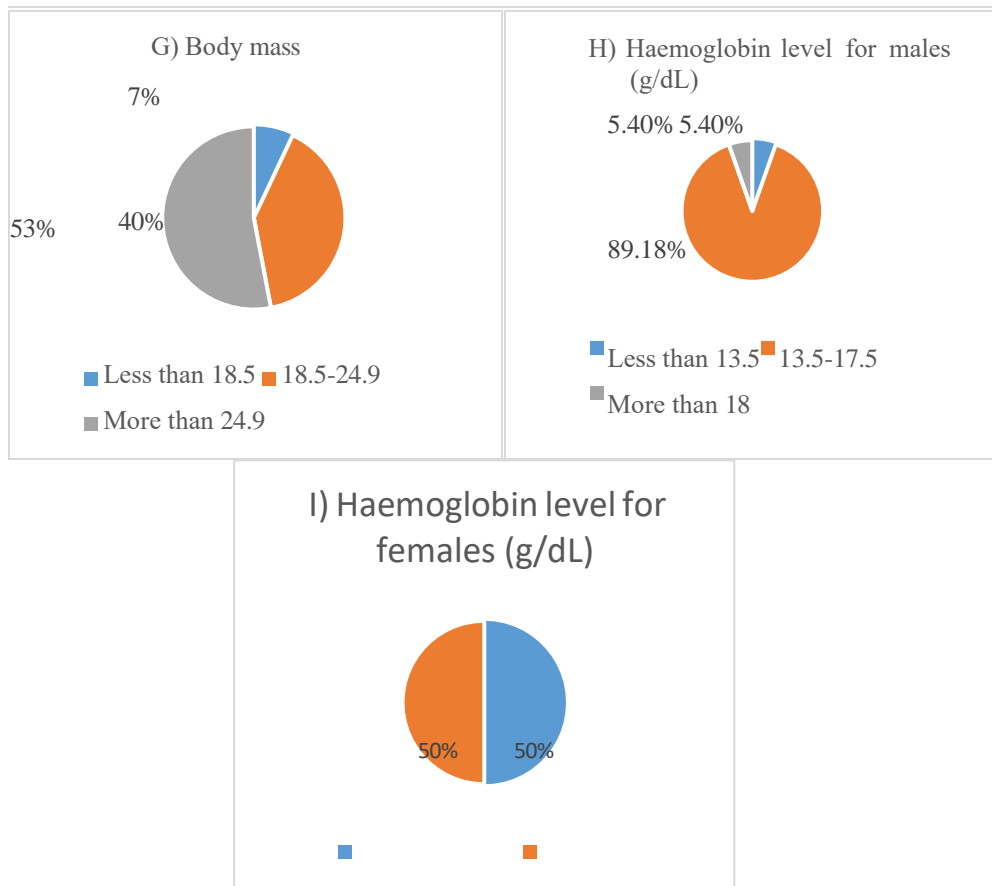
Females, whose hemoglobin percentage is less than 11.5, representing 50% (13/26), and those in the normal range of 11.5-15.5 represent 50% (13/26) of the total female participated in this study.

The normal range

Test	Normal range
Hb	M: 12.5-17.5 ... F: 11.5 – 15.5 g/dL
Body mass index	18.5-24.9 kg

Table (1) 4.1: The normal range





Figures A,B,C,D,E,F,G,H and I: Demographics information of the participants in this study A) Places where samples were collected. B) Genders of participates in this study, C) status of participates in this study, D) Age of participates in this study, E) The education level of participates in this study, F) Smoking status of participates in this study, G) Body mass index of participates in this study, H) The level of haemoglobin in males whose participates in this study, and I) The level of haemoglobin in females whose participates in this study.

4.2. The basic variables for the study

The approval rate reached 83% (83/100) and there are 17% (17/100) are neutral about that the Social media programs provide information that informs us about the importance of healthy nutrition.

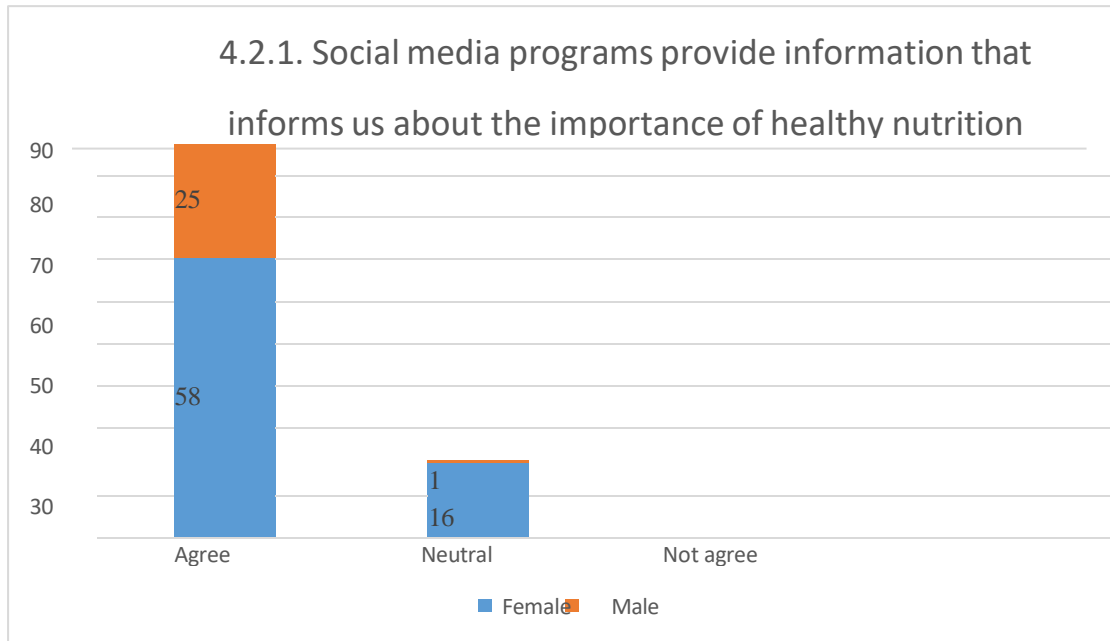


Figure (6) 4.2.1: Social media programs provide information that informs us about the importance of healthy nutrition

A healthy eating plan helps us to maintain our health from diseases. 67% (67/100) of Participants agree with this, but there is a slight increase in the percentage of neutrals reached 20% (20/100), and the percentage of those who disagree, up to 13% (13/100).

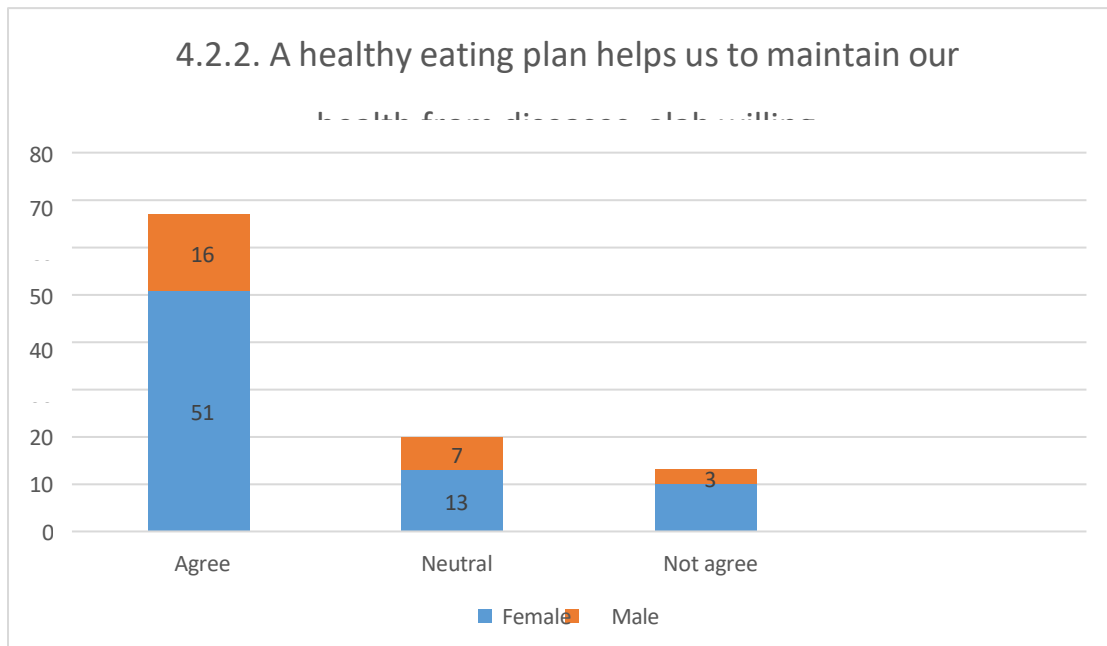


Figure (7) 4.2.2: A healthy eating plan helps us to maintain our health from diseases, Allah willing.

The percentage of those who agree that the level of education and knowledge helps to know the importance of iron in food is 80% (80/100), and the rate of neutrals is 16% (16/100) and 4% (4/100) do not agree.

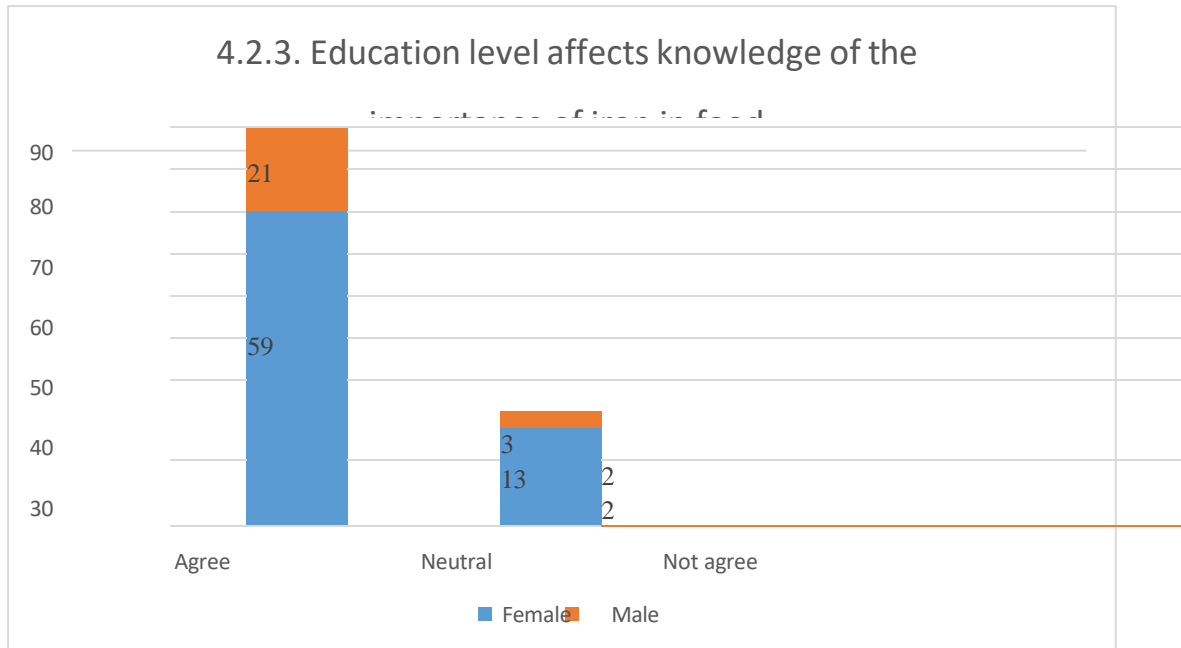


Figure (8) 4.2.3: Education level affects knowledge of the importance of iron in food.

83% (83/100) agreed that iron deficiency in food and malnutrition may cause anemia, and 17% (17/100) are neutral.

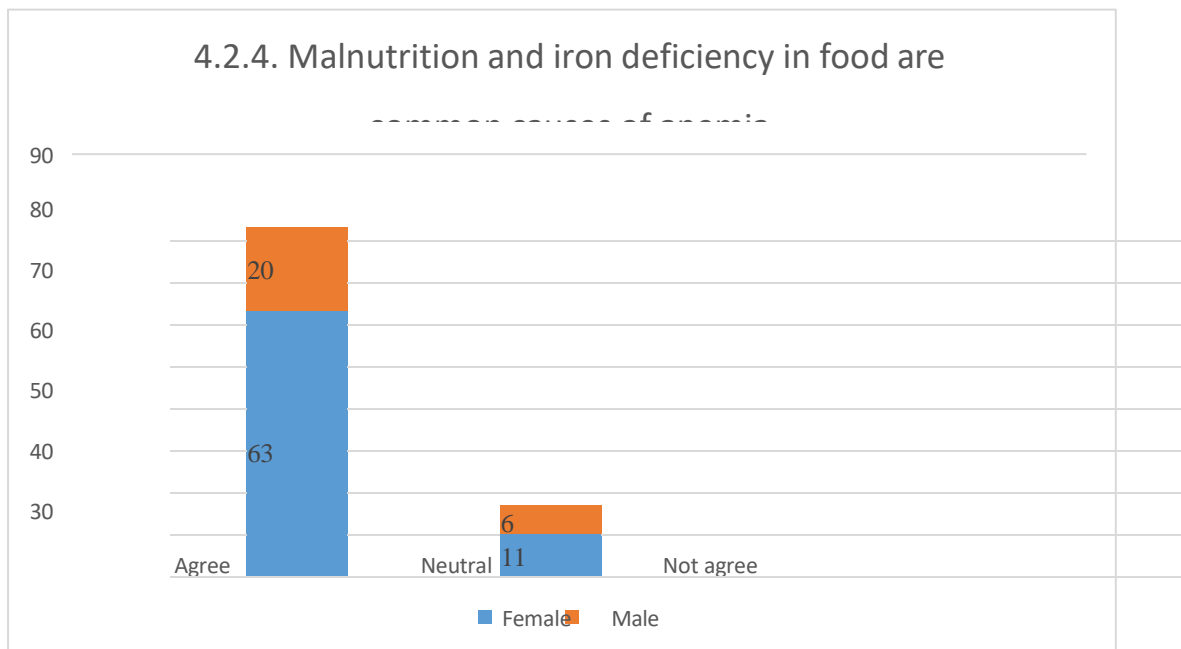


Figure (9) 4.2.4: Malnutrition and iron deficiency in food are common causes of anemia.

78% (78/100) of the participants agreed, 21% (21/100) were neutral, and 1% (1/100) did not agree that the body has a limited ability to absorb iron from food and lose iron in large amounts.

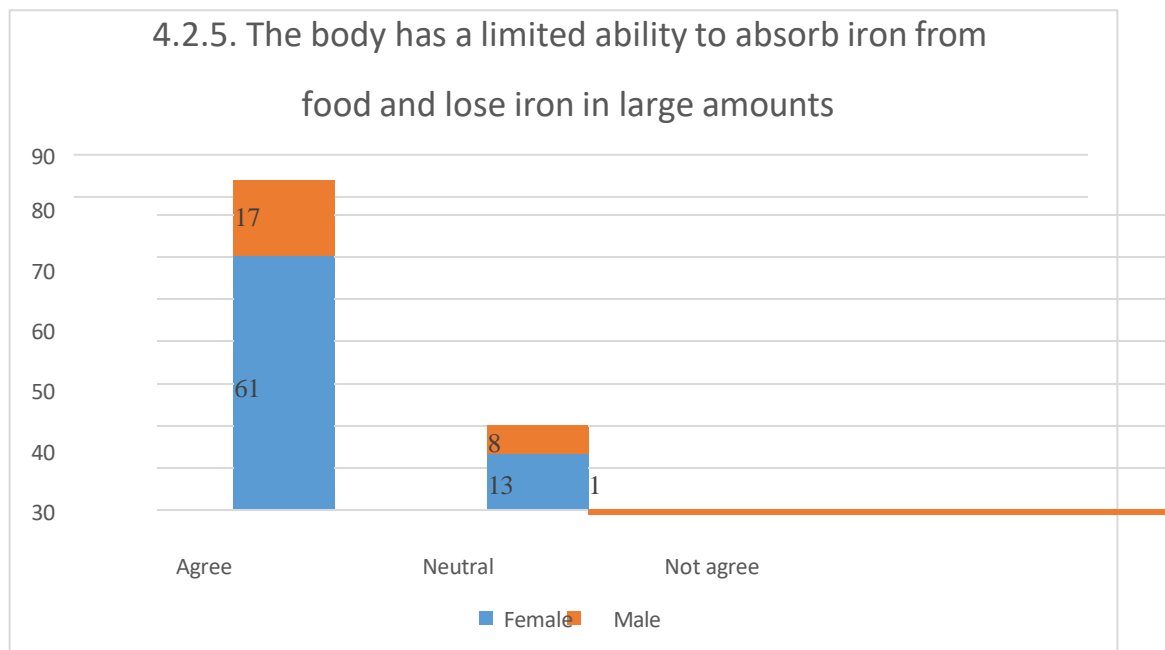


Figure (10) 4.2.5: The body has a limited ability to absorb iron from food and lose iron in large amounts.

80% (80/100) approved iron as one of the important minerals that play a major role in transporting oxygen, and 20% (20/100) are neutral.

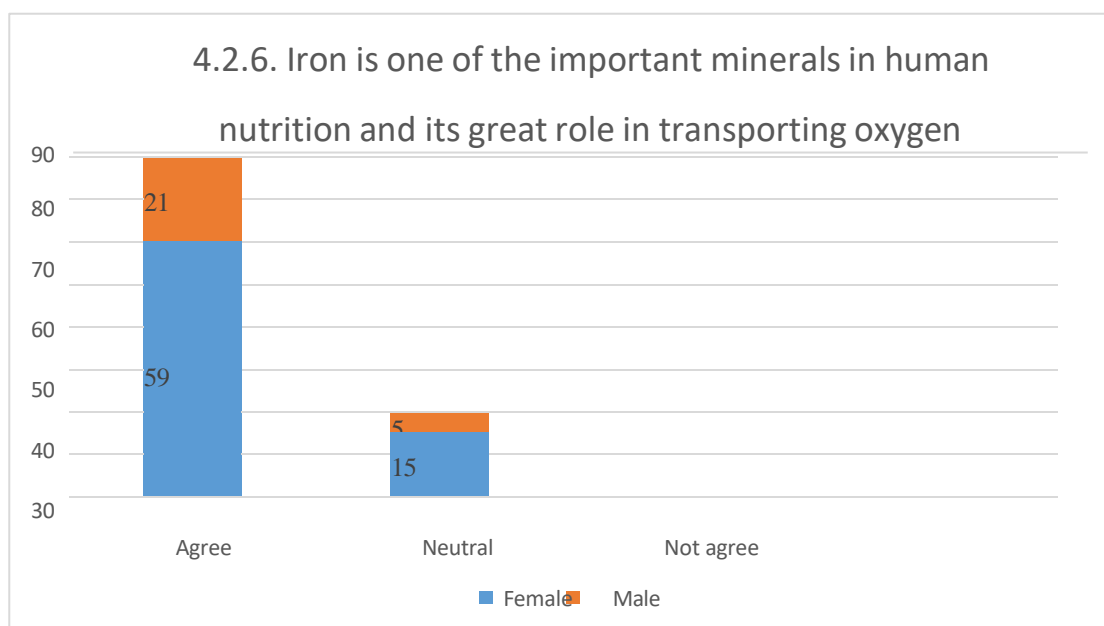


Figure (11) 4.2.6: Iron is one of the important minerals in human nutrition and its great role in transporting oxygen.

The percentage of approval that red meat contains large amounts of easily absorbed iron is 81% (81/100), 15% (15/100) are neutral, and 4% (4/100) do not agree.

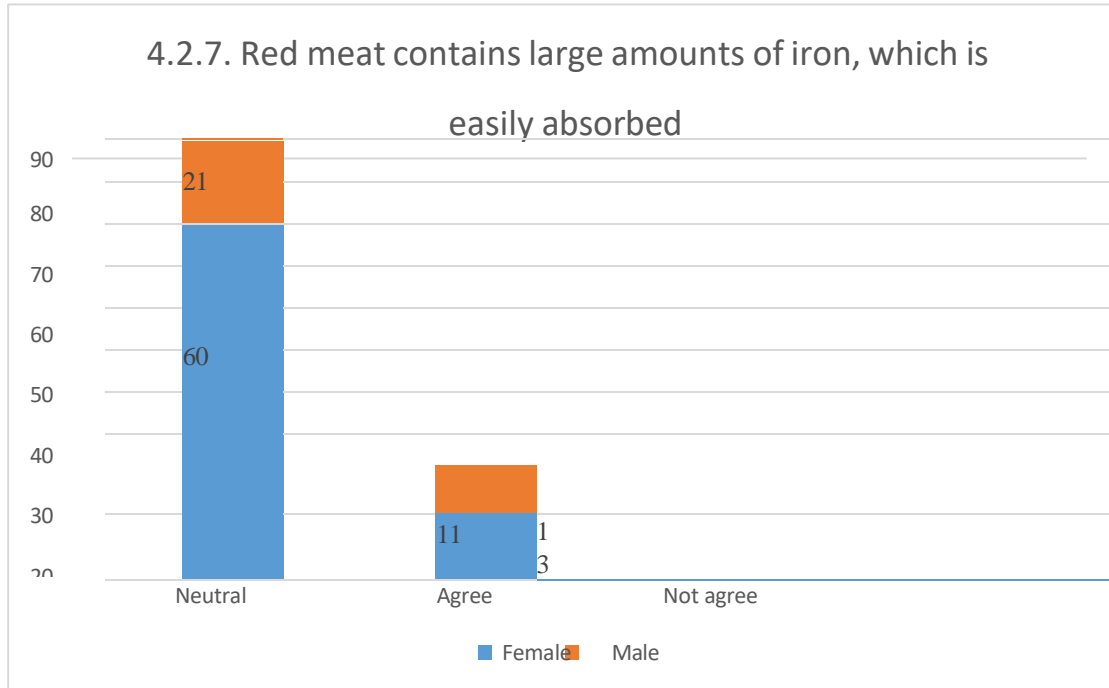


Figure (12) 4.2.7: Red meat contains large amounts of iron, which is easily absorbed.

The percentage of approval that Vegetables are foods that contain iron, but the body does not absorb a large amount of it is 78% (78/100), 16% (16/100) are neutral, and 6% (6/100) do not agree.

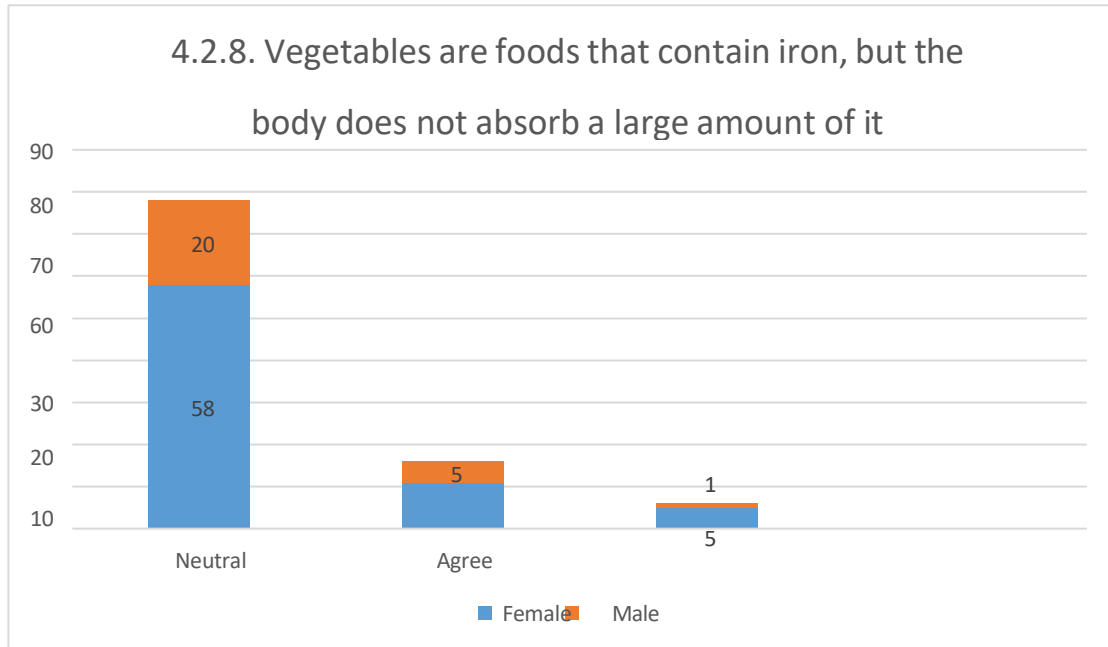


Figure (13) 4.2.8: Vegetables are foods that contain iron, but the body does not absorb a large amount of it.

74% (74/100) of the participants agreed that coffee reduces iron absorption to small percentages, 22% (22/100) are neutral, and 4% (4/100) of participants do not agree with this.

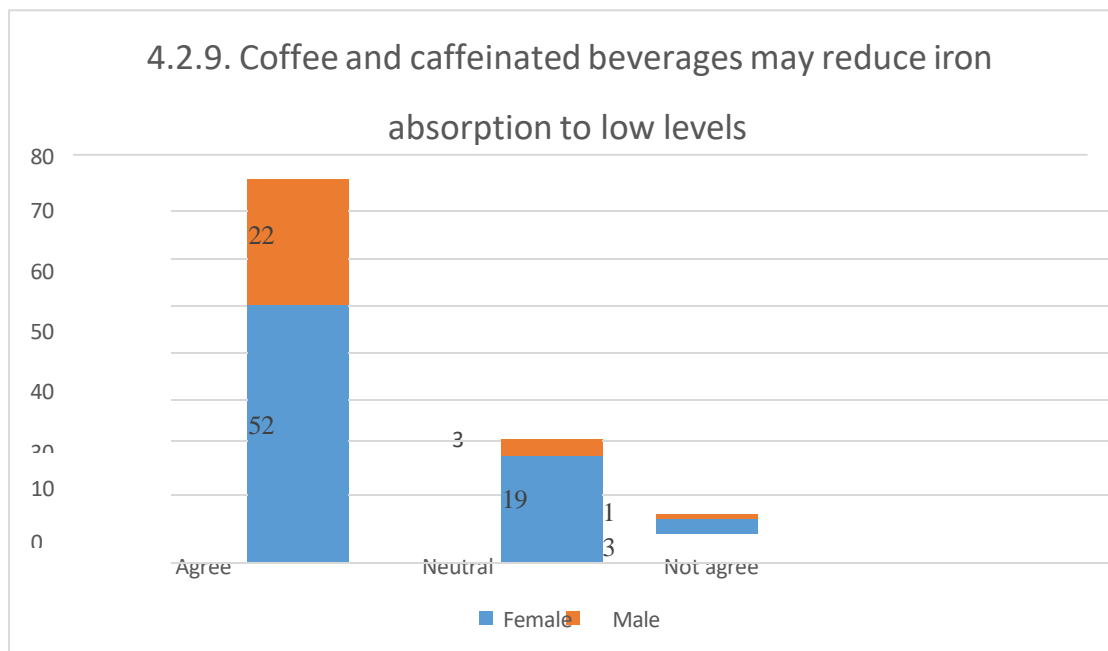


Figure (14) 4.2.9: Coffee and caffeinated beverages may reduce iron absorption to low levels.

59% (59/100) agree that vegans, people who do not eat meat, are more prone to iron deficiency, 25% (25/100) are neutral, and 16% (16/100) disagree.

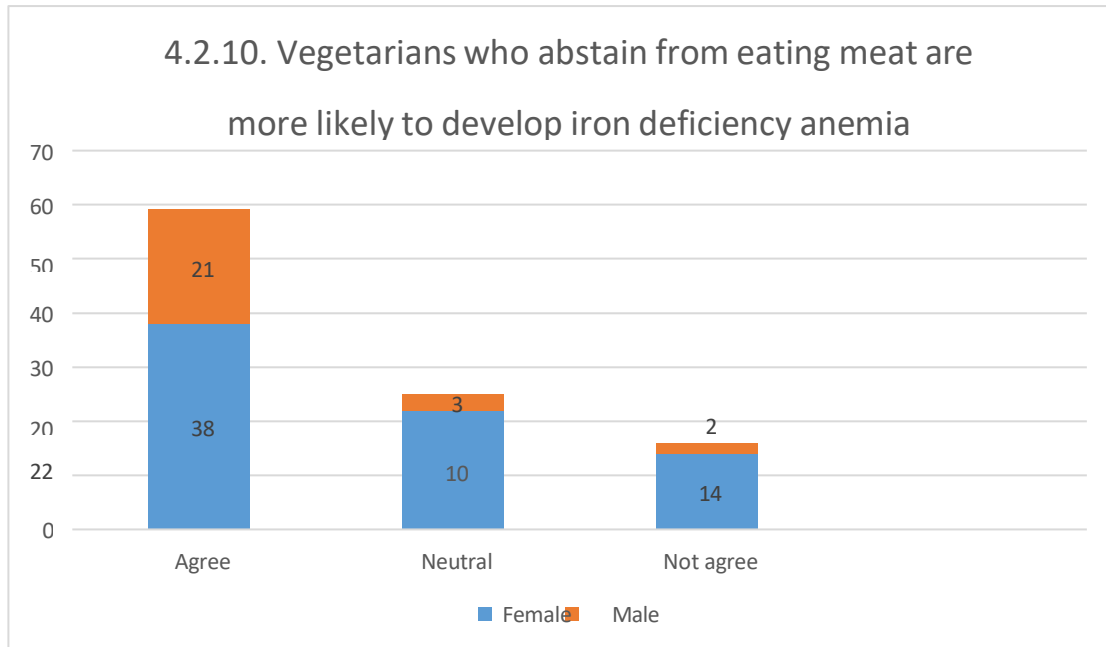


Figure (15) 4.2.10: Vegetarians who abstain from eating meat are more likely to develop iron deficiency anemia.

81% (81/100) agree, 18% (18/100) are neutral and 1% (1/100) disagree that the Common symptoms of anemia include shortness of breath, heart palpitations, and a pale face.

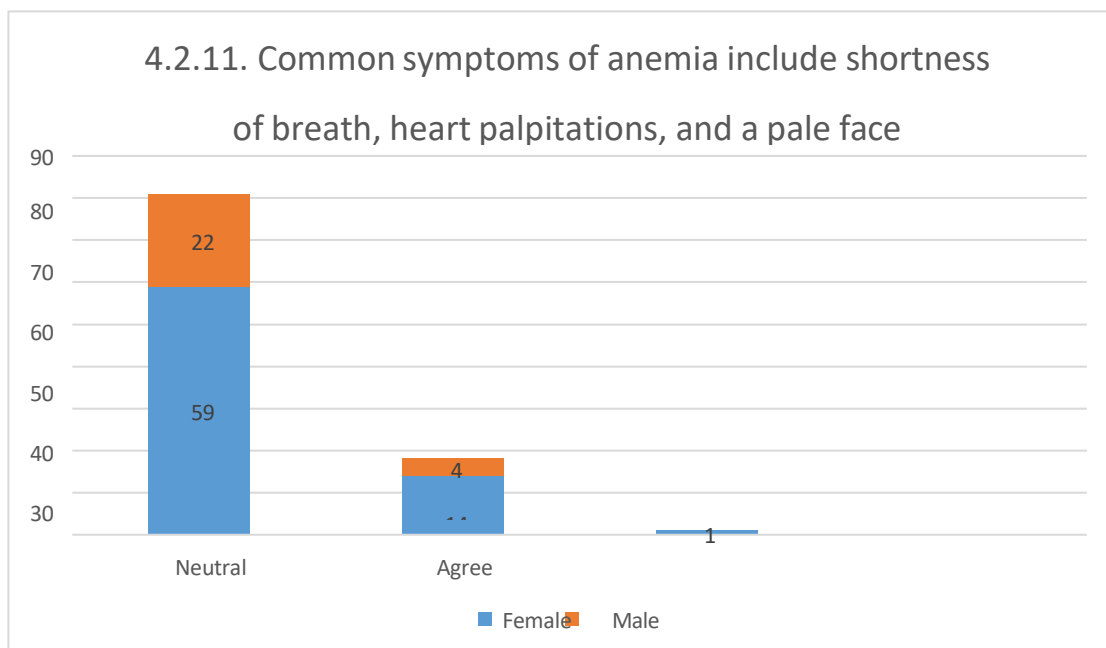


Figure (16) 4.2.11: Common symptoms of anemia include shortness of breath, heart palpitations, and a pale face.

4.3. Relation of smoking status with hemoglobin (g/dL) (N=100) There was a significant increase in the average hemoglobin of male and female smokers more than non-smoker participants.

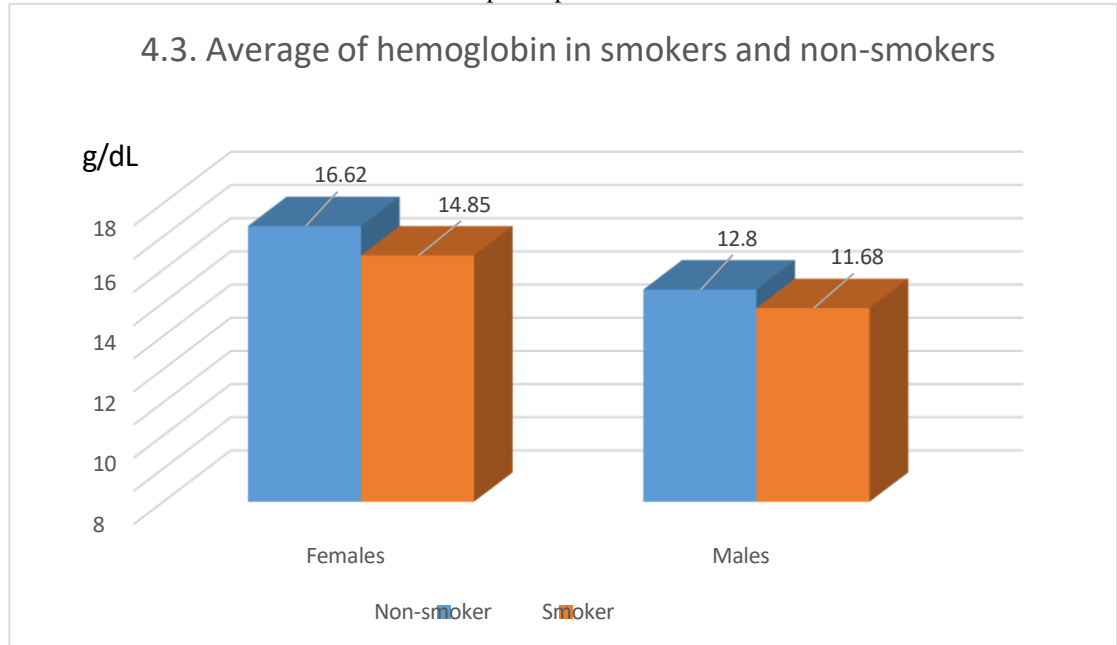


Figure (17) 4.3: Average of hemoglobin in smokers and non-smokers.

4.4. Relation of Drinking coffee status with hemoglobin (g/dL) according to the answers of the participants in the study (N=100)

The chart below was based on the participants' answers to this question (Do you overdose on caffeinated drinks?). There was no clear effect on the level of hemoglobin according to the excessive drinking of coffee

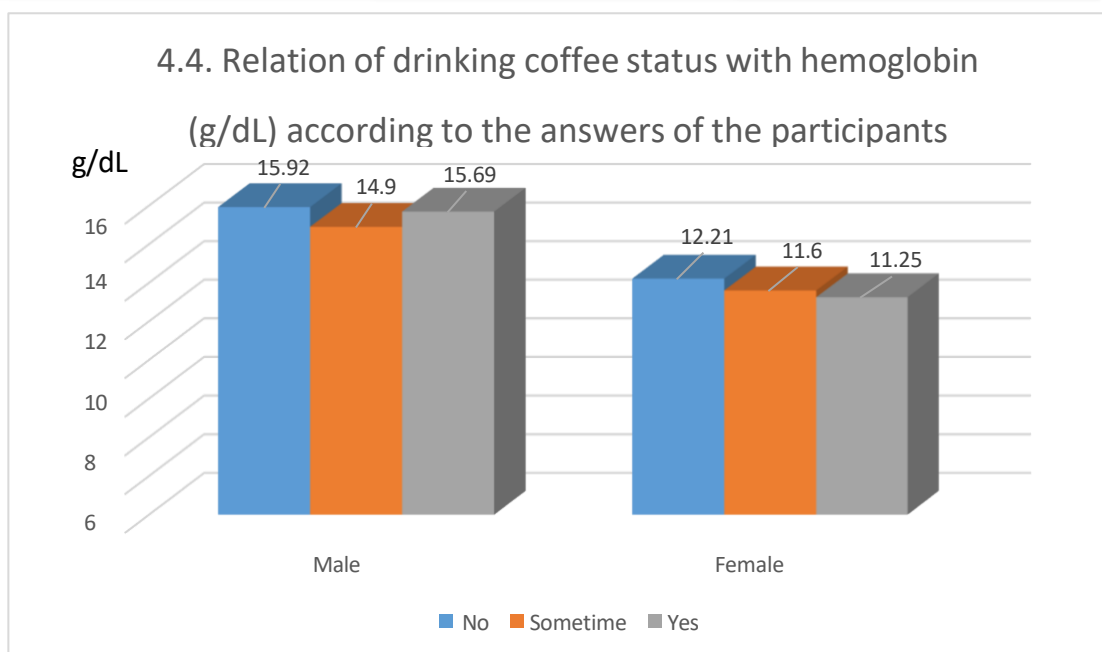


Figure (18) 4.4: Relation of drinking coffee status with hemoglobin (g/dL) according to the answers of the participants.

4.5. Relation of meat-eating status with hemoglobin (g/dL) (N=100) (Do you eat excessive amounts of meat?). There was an effect on hemoglobin level, according to meat consumption.

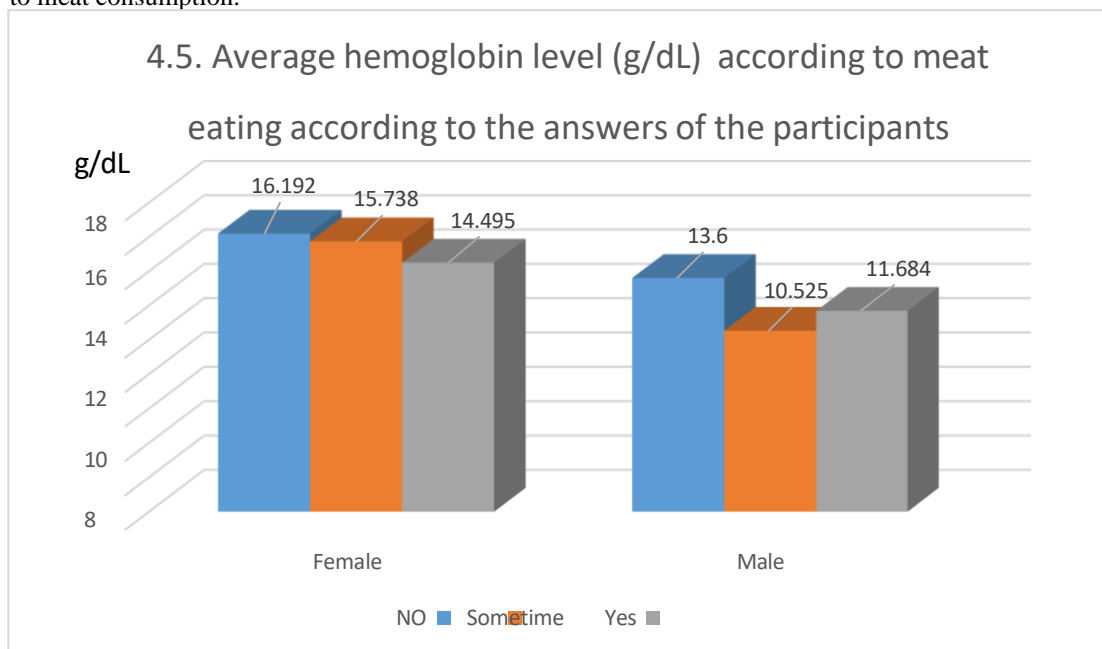


Figure (19) 4.5: Average hemoglobin level (g/dL) according to meat eating according to the answers of the participants.

- 5 Relation of body mass index with hemoglobin According to the distribution of participants in demographic information (N=100) There was a slight effect on the hemoglobin level, which was related to the participants' body mass.

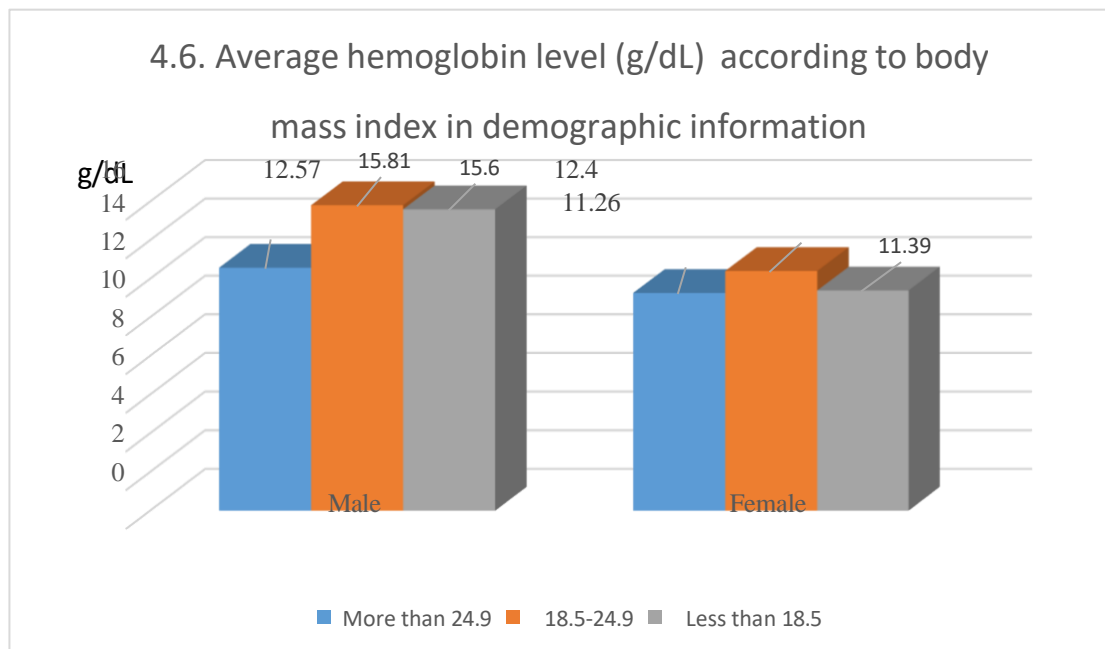


Figure (20) 4.6: Average hemoglobin level (g/dL) according to body mass index in demographic information.

DISCUSSION

Nutrition is an essential source for human beings to provide nutrients to the body. It plays a major role in providing minerals that help hemoglobin to do its job, including iron, which is available in food, and emphasizing on the participants the importance of nutrition and its regulation so that the person is fully aware of iron and its importance role in hemoglobin and the body as a general.

In our study, we have found that there are many factors that may affect the level of hemoglobin, including nutritional and non-nutritive factors. We find that there is an agreement in some points between our analysis and previous studies when we compare it with previous research.

In our analysis, when we compared smokers to non-smokers, we found a significant increase in hemoglobin in smokers. These findings are supported by previous studie (BK, AK, M, & AK, 2012) that demonstrated increased hemoglobin in smokers.

In our analysis, when we looked at the participants' answers to excessive drinking of caffeinated beverages such as coffee and their effect on hemoglobin, we did not find a clear effect on hemoglobin, according to coffee use. (Dasa & Abera, 2018) this is the previous study that showed that there is an effect on the level of hemoglobin according to the consumption of caffeine.

In our analysis, we found a significant effect on average hemoglobin, depending on the respondents' answers to the questionnaire that were based on their meat consumption. These findings are supported by previous studies (Dasa & Abera, 2018) that demonstrated an effect on hemoglobin level according to meat consumption.

In our analysis, we found a slight effect on the hemoglobin level according to the participants' BMI.

In our study, it was found that the awareness rate of the participants was very high for their knowledge of the importance of nutrition and the benefits of iron and its relationship with the level of hemoglobin, with a very small percentage of the participants who were neutral or disagreeing with some information.

CONCLUSION

Nutrition is a basic and important process that plays a major role in the body by providing the necessary materials that help the body carry out its vital functions such as vitamins, minerals and other nutrients. The iron mineral available in food is of great importance to hemoglobin in order to perform its main function.

In our study, we found that there are many factors that have affected the level of hemoglobin, including nutritional and non-nutritional factors such as smoking, meat, and body mass.

RECOMMENDATION

Health education should be carried out to improve the quality of life to high-quality levels. Improving the quality of life depends mainly on nutrition. Awareness programs should be conducted in schools, educational organizations, and even social media about the importance of organizing food to obtain the basic materials that the body needs, such as iron and other minerals and vitamins, and knowing that unhealthy behaviors, whether nutritional or non-nutritional, such as smoking, may negatively affect a person's health. I advise to exercise and make it a daily routine in order to greatly preserve human health.

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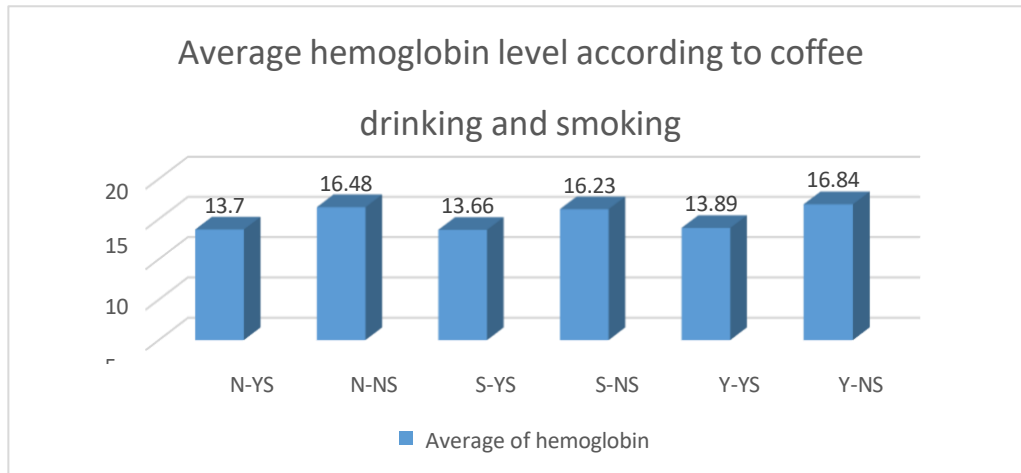
APPENDIX

Relation of smoking status with hemoglobin (N=100)

Smoker (male + female) The hemoglobin (g/dL)					Non-smoker (male + female) The hemoglobin (g/dL)				
(N) Male and female	%	Range of Hb in participants	Mean of Hb (g/dL)	S.D	(N) male and female	%	Range of Hb in participants	Mean of Hb (g/dL)	S.D
28 Male	28%	14-18.2	16.62	0.996	46 Male	46%	7-17.5	14.85	1.780
1 Female	1%	12.8	12.8		25 Female	25%	8.5-15.2	11.68	2.254

Relation of Drinking coffee status with hemoglobin (g/dL) according to the answers of the participants in the study (N=100)

Excessive drinking of coffee	(male) The hemoglobin (g/dL)					(Female) The hemoglobin (g/dL)				
	N	%	Range of Hb in participants	Mean of Hb (g/dL)	S.D	N	%	Range of Hb in participants	Mean of Hb (g/dL)	S.D
Yes	32	32%	10.8-17.8	15.925	1.435	14	14%	8.5-15.2	12.214	2.047
Sometime	25	25%	10.5-17.2	14.908	2.171	6	6%	9-15	11.6	2.471
No	17	17%	13.6-18.2	15.694	1.294	6	6%	9-15	11.25	2.484



Relation of meat-eating status with hemoglobin according to the answers of the participants in the study (N=100)

Excessive eating of meat	(male) The hemoglobin (g/dL)					(Female) The hemoglobin (g/dL)				
	N	%	Range of Hb in participants	Mean of Hb (g/dL)	S.D	N	%	Range of Hb in participants	Mean of Hb (g/dL)	S.D
Yes	26	26%	14.5-18.2	16.192	1.120	3	3%	12.5-15	13.6	1.216
Sometime	26	26%	14-17.3	15.738	1.030	4	4%	9-13.5	10.525	2.121
No	22	22%	7-17.2	14.495	2.499	19	19%	8.5-15	11.684	2.240

Relation of body mass index with hemoglobin According to the distribution of participants in demographic information (N=100)

Body mass	(male) The hemoglobin (g/dL)					(Female) The hemoglobin (g/dL)				
	N	%	Range of Hb in participants	Mean of Hb	S.D	N	%	Range of Hb in participants	Mean of Hb	S.D
Less than 18.5	4	4%	10.5-16	12.575	2.540	3	3%	9.5-13.7	11.266	2.177
18.5-24.9	31	31%	7-18	15.816	1.948	9	9%	8.5-15.2	12.4	2.870
More than 24.9	39	39%	13.6-17.8	15.602	1.125	14	14%	9-13.5	11.392	1.786

تقييم الوعي الشخصي تجاه التغذية وعلاقتها بالهيموجلوبين بمنطقة نجران بالمملكة العربية السعودية 2023

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الملخص:

التغذية هي عملية مهمة يتم فيها اعتماد الجسم على العناصر الغذائية الهامة لبناء الجسم والحفاظ على الصحة الجيدة والسلامة. التغذية هي عامل رئيسي قوي في تعزيز الصحة وتحسين نوعية الحياة. تعتبر التغذية مصدراً أساسياً للحديد الذي يساعد الهيموجلوبين على القيام بوظيفته. الهيموجلوبين هو أحد أهم البروتينات ويلعب دوراً رئيسياً في نقل الأكسجين داخل الجسم. سوء التغذية أو عدم تناول كمية كافية من الحديد قد يسبب نقص مخزون الحديد، مما قد يؤثر سلباً على مستوى الهيموجلوبين ووظيفته. هناك العديد من العوامل التي قد تؤثر على الهيموجلوبين، وقد تكون عوامل غذائية أو غير غذائية، ومن بينها التدخين. الهدف من دراستنا هو تقييم الوعي الشخصي تجاه التغذية وعلاقتها بالهيموجلوبين في منطقة نجران بالمملكة العربية السعودية. وتشمل الدراسة 100 عينة، عينات الدم الوريدي. تم عمل تحليل CBC لعينات الدم. ومن النتائج وجدنا أن هناك تأثير على مستوى الهيموجلوبين نتيجة لعدة عوامل منها العوامل الغذائية مثل اللحوم والعوامل غير الغذائية مثل التدخين وكتلة الجسم. بالإضافة إلى ذلك وجدنا أن نسبة وعي المشاركين كانت عالية جداً لمعرفة أهمية التغذية وفوائد الحديد وعلاقتها بمستوى الهيموجلوبين. ينبغي إجراء التثقيف الصحي في المؤسسات التعليمية لتوجيه الناس إلى وضع خطط غذائية لتحسين نوعية الحياة نحو الأفضل.

الكلمات المفتاحية: الوعي الشخصي، الهيموجلوبين.