IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

GLOBALLY COMMENCE BURDEN FOR MANAGEMENT AND TREATMENT OF ANAEMIA WIH SPECIAL REFERENCE TO FEMALE

[1]Monika Yadav, ,

[1]ASSISTANT PROFESSOR,
PHARMACY

Smriti college of pharmaceutical education Indore Mp,

Abstract : Anaemia, defined as a hemoglobin level two standard deviations below the mean for age, is prevalent among infants and children as well as adults. Characterizing the anemia as microcytic, normocytic, or macrocytic. Microcytic anemia due to iron deficiency is the most common type of anemia in children and adult.. Iron deficiency anemia, which can be associated with cognitive issues, is prevented and treated with iron supplements or increased intake of dietary iron The iron losses must be balanced by the intake of iron in the food.

Key words- -. anaemia.haemoglobin,vit.B12, Vitamin C, Glucose-6-phosphate dehydrogenase, , folic acid, Indian gooseberry, premature, WIFS**,** Malabsorption

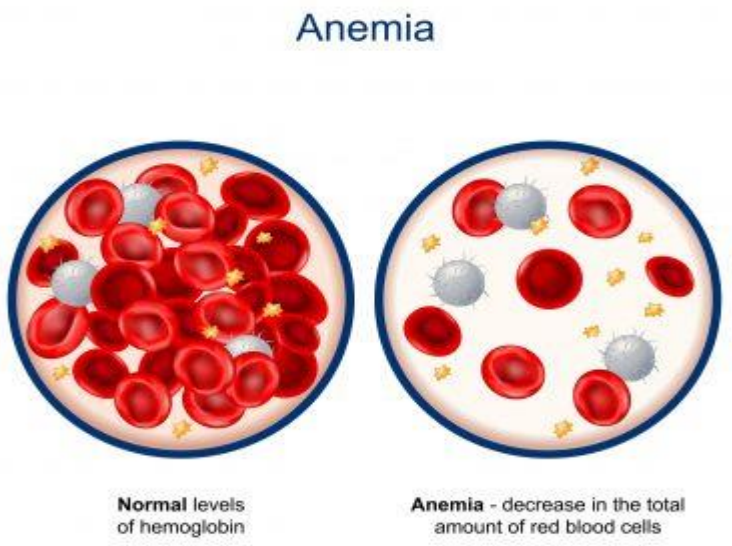
I. INTRODUCTION

- **INTRODUCTION**

Anaemia is a common nutritional deficiency disorder and global public health problem which affects both developing and developed countries with major consequences for human health and their social and economic development (WHO 2005). According to WHO (2004) reports, one third of the global populations (over 2 billion) are anaemic due to imbalance in their nutritious food.

Anaemia is a critical public health problem in India that affects women and children throughout the lifecycle. Anaemia in boys and girls limits their development, learning ability, reduces concentration in daily tasks, increases their vulnerability to infection, increases school dropout rates, reduces physical fitness and work productivity. Anaemia in girls during pregnancy is associated with premature births, low birth weight, and peri-natal and
maternal mortality.

.



What is Iron?

Iron is one of the essential nutrient required by our body , as it cannot madeby our body on its own. Iron is so important to your body that is has been referred to as the body's gold. Most of the iron in your body is found as part of proteins called hemoglobin, which is found in red blood cells of blood. Hemoglobin in blood carries the oxygen you breathe into your lungs to all tissues throughout the body.

Human blood contains a red pigment called haemoglobin, which is rich in iron. It carries oxygen to different parts of body. Deficiency of iron in diet leads to decreased amount of haemoglobin, making the blood thin and less red in colour which leads to less supply of oxygen to different parts of the body; this state is known as anaemia.

Cut off levels of hemoglobin for diagnosis of Anemia:

Age/Sex Hb Gram/dl	**Age/Sex Hb Gram/dl**
Children 6 months to 6 years 11	11
Children 6 to 14 years 12	12
Adolescents 15-19 years 12	12
Adult male 13	13
Adult female 12	12
Adult female pregnant 11	11

If the level falls below those above, then the person is diagnosed as having anaemia.

Classification of anaemia according to WHO

Mild anaemia	11.9 gm to 10 gmHb /100 ml blood
Moderate anaemia	9.9 gm to 7gm Hb /100 ml blood
Severe anaemia	< 7 gmHb/100 ml blood
Anaemia in non-pregnant woman	<12 gmHb/100 ml blood (above 15 years of age)
Anaemia in pregnant women	<11 gmHb/100 ml blood

II. CAUSES AND EFFECTS OF ANAEMIA a) Common causes of

• Poor Dietary intake of iron resulting in deficiency of iron in the body and thus Iron deficiency anaemia (less intake of iron rich foods; Gender discrimination in food allocation in a family aggravates the situation.

• Low bio-availability of iron- Habitual intake of cereal based diet high in phytate and poor consumption of iron absorption enhancers such as vitamin C result in low availability of iron

• Dietary deficiency of vitamins such as Folic Acid, Vitamin C, Vitamin B12.

Non nutritional causes of anaemia:

• Accelerated increase in requirement for iron during adolescent period

• Hookworm infestation

• Infections such as Malaria

• Loss of blood in case of heavy menstrual bleeding.

• Teenage marriage and early pregnancy – Teenage pregnancy places double burden on the physically and physiologically immature body of girls and results in increasing the likelihood of anaemia, maternal mortality, pregnancy complications and birth of low birth weight babies.

Signs and Symptoms of anaemia:

Definitive diagnosis of anaemia can only be made by a blood test that measures Haemoglobin(Hb) levels in the blood.The test for Hb is carried out in health centres. However there are some signs that may assist in identifying anaemia. They include:

- Soreness of the mouth, with cracks at the corners.
- Dizziness, tiredness, fatigue and low energy
- Unusually rapid heartbeat, particularly with exercise
- Shortness of breath and frequent headaches, particularly with exercise
- Lack of interest in play and studies • Difficulty/ inability to concentrate
- Leg cramps
- Lowered resistance to infections Iron deficiency anemia develops after normal

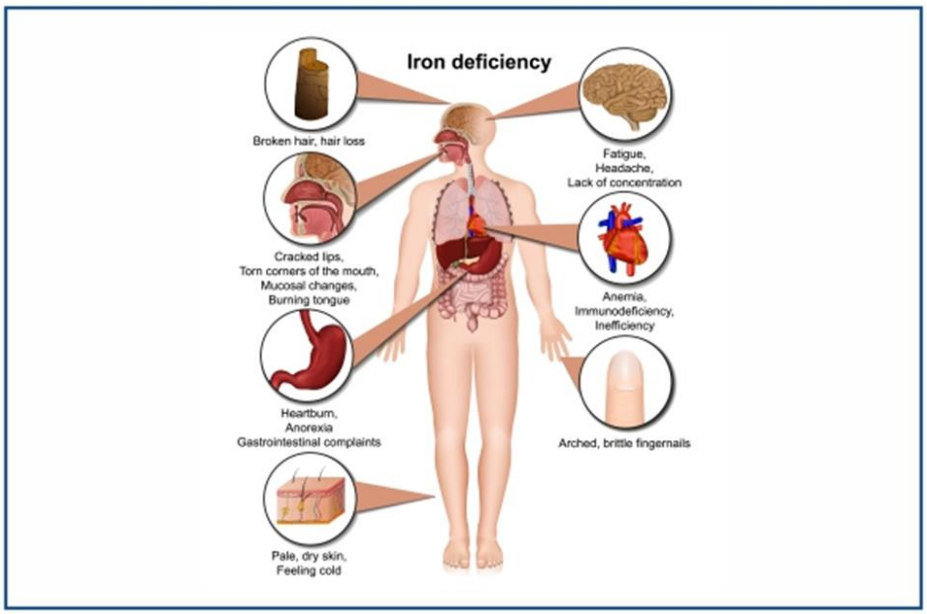
Types of Anaemia:

There are several types and classifications of anaemia. The occurrence of anaemia is due to the various red cell defects such as production defect (aplastic anaemia), maturation defect (megaloblastic anaemia), defects in haemoglobin synthesis (iron deficiency anaemia), genetic defects of haemoglobin maturation (thalassaemia) or due to the synthesis of abnormal haemoglobin (haemoglobinopathies, sickle cell anaemia and thalassaemia) and physical loss of red cells (haemolytic anaemias).

1.Iron-Deficiency Anaemia:

Iron is essential for the various activities of the human body especially in the haemoglobin synthesis. The following figure shows the distribution and storage of iron (Fe) in the various parts of the human body. Iron deficiency anaemia is a condition in which the body has too little iron in the bloodstream.

This form of anaemia is more common in adolescents and in women before menopause. Blood loss from heavy periods, internal bleeding from the gastrointestinal tract, or donating too much blood can all contribute to this disease. A low level of iron, leading to anaemia, can result from various causes. The causes of irondeficiency anaemia are pregnancy or childhood growth spurts, Heavy menstrual periods, Poor absorption of iron, Bleeding from the gut (intestines), dietary factors (iron poor or restricted diet), medication (aspirin ibuprofen, naproxen and diclofenac), Lack of certain vitamins (folic acid and vitamin B12), Bleeding from the kidney,Hookworm infection, Red blood cell problems, Bone marrow problems (Harper et al.

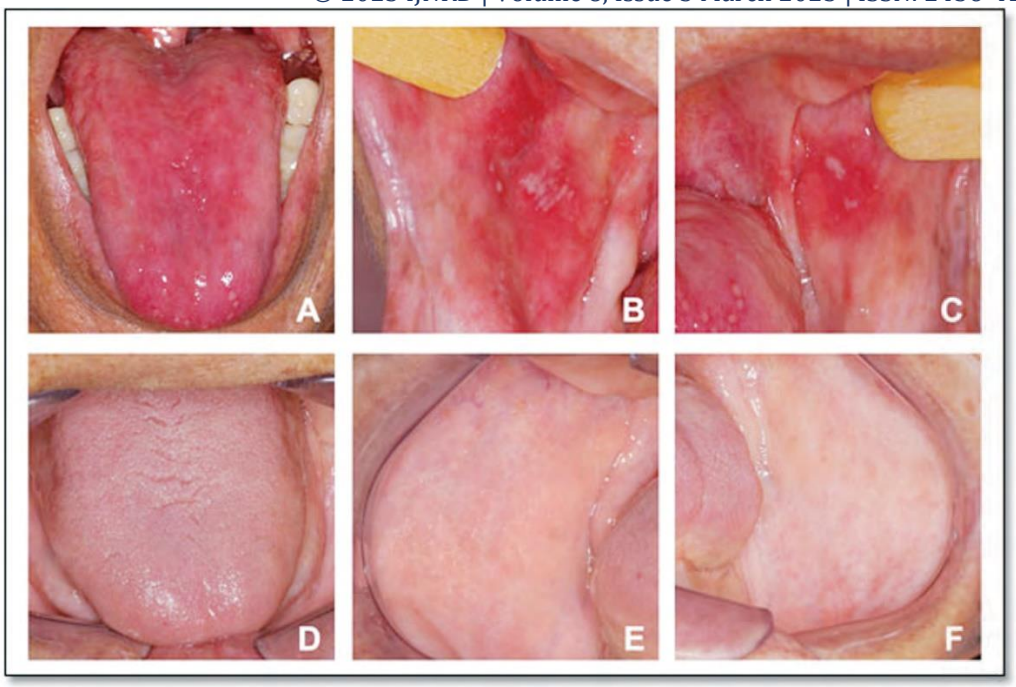


Symptoms:

Tiredness, lethargy, feeling faint and becoming breathless easily, headaches, irregular heartbeats (palpitations), altered taste, sore mouth and ringing in the ears (tinnitus). Anaemia in pregnancy increases the risk of complications in both mother and baby such as low birth weight baby, preterm (premature) delivery and postnatal depression. Low iron reserves in the baby may also lead to anaemia in the newborn baby (Pasricha et al., 2010).

Pernicious anaemia:

Pernicious anaemia is the most common cause of Vitamin B12 deficiency Vitamin B12 is essential for life. It is needed to make new cells in the body such as the many new red blood cells which are made every day. Vitamin B12 is found in meat, fish, eggs, and milk. A lack of vitamin B12 leads to anaemia and sometimes to other problems. A lack of vitamin B12 (B12 deficiency) is one cause of anaemia. Pernicious anaemia usually develops over the age of 50. Women are more commonly affected than men, and it tends to run in families. It occurs more commonly in people who have other autoimmune diseases. Certain medicines used also may affect the absorbtion of vitamin B12. The most common example is metformin, colchicine, neomycin, and some anticonvulsants used to treat epilepsy (Turner and Talbot, 2009).



Symptoms:

Psychological problems like depression, confusion, difficulty with memory or even dementia and Nervous problems like numbness, pins and needles, vision changes and unsteadiness. can develop. Prolonged or severe v deficiency may therefore cause permanent brain or nerve damage.

Haemolytic Anaemia:

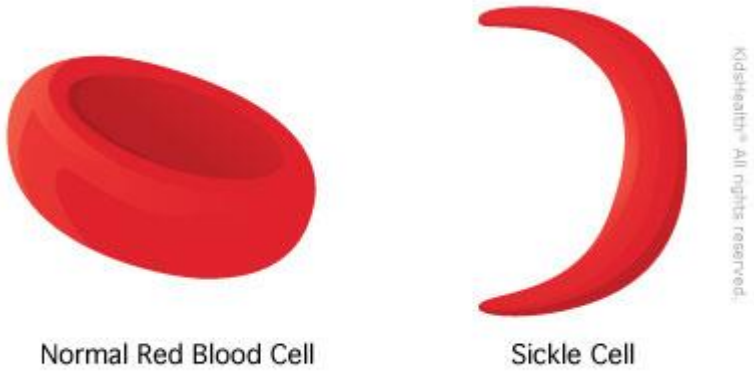
Haemolytic anaemia is a condition in which red blood cells are destroyed and removed from the bloodstream before their normal lifespan is up. Haemolytic anaemia can affect people of all ages, races and sexes. Haemolytic anaemia can lead to various health problems such as fatigue, pain, arrhythmias, an enlarged heart and heart failure. Inherited haemolytic anaemias include Sickle cell anaemia, Thalassaemias, hereditary spherocytosis, hereditary elliptocytosis, Glucose-6-phosphate dehydrogenase (G6PD) deficiency, Pyruvate kinase deficiency. Acquired haemolytic anaemias include Immune haemolytic anaemia, Autoimmune haemolytic anaemia, Alloimmune haemolytic anaemia, Drug-induced haemolytic anaemia, Mechanical haemolytic anaemias, , Certain infections and substances can also damage red blood cells and lead to haemolytic anaemia.

Symptoms:

The most common symptom of anaemia is fatigue. A low red blood cell count can also cause shortness of breath, dizziness, headache, coldness in your hands or feet, pale skin, gums and nail beds, as well as chest pain. Symptoms of haemolytic anaemia include Jaundice, Pain in the upper abdomen, Leg ulcers and pain, A severe reaction to a blood transfusion. Treatments for haemolytic anaemia include blood transfusions, medicines, plasmapheresis, surgery, blood and marrow stem cell transplants and lifestyle changes (Natasha and Yasmin 2010).

Sickle cell anaemia:

Anaemia in which the body makes sickle-shaped ("C"-shaped) red blood cells is called Sickle Cell anaemia. It contain abnormal haemoglobin which causes sickle shape and can't move easily through the blood vessels. The clumps of sickle cells block blood flow that lead to the limbs and organs. Blocked blood vessels causes pain, serious infections, and organ damage. Sickle cells usually die after about 10 to 20 days and the body can't reproduce red blood cells fast enough to replace the dying ones, which causes anaemia.

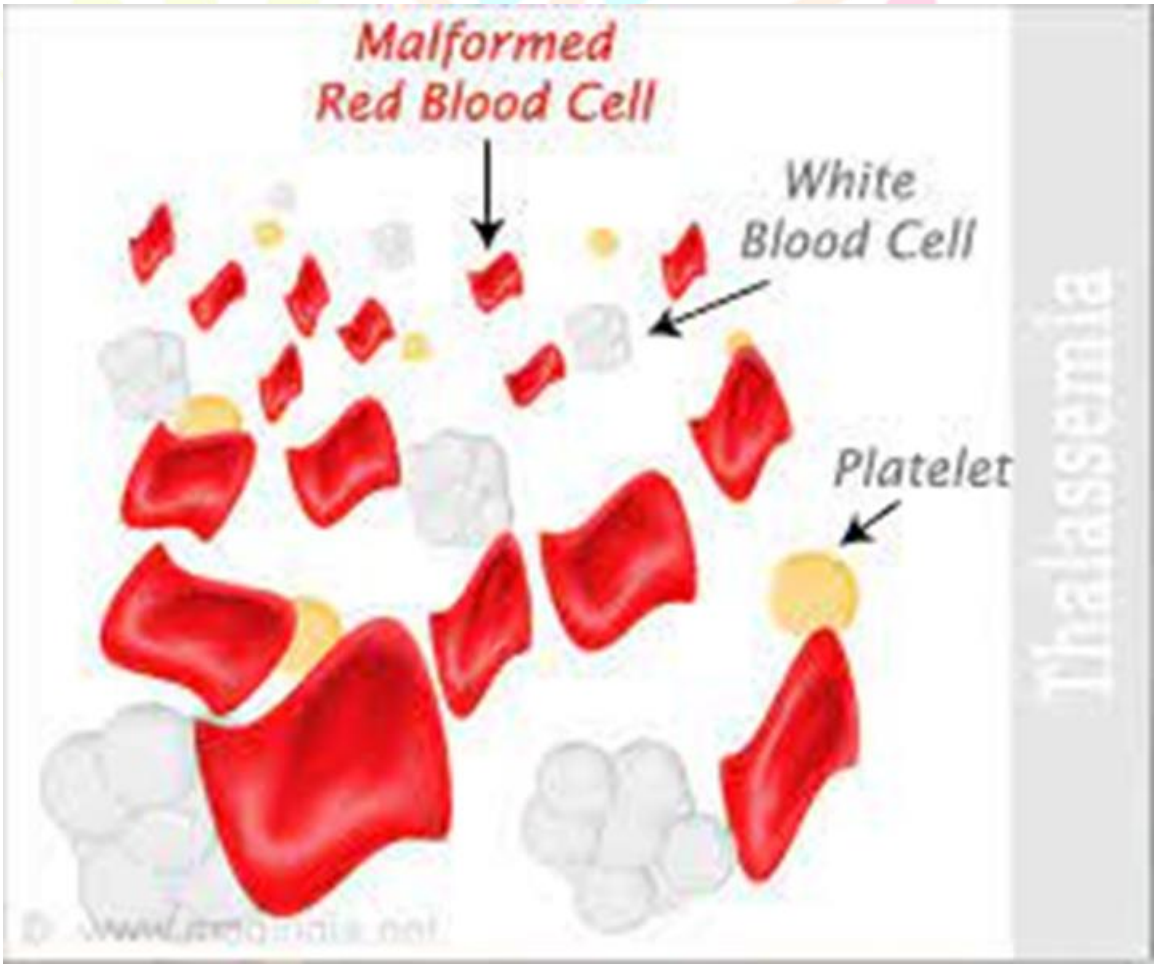


Symptoms:

Sickle cell anaemia is an inherited, lifelong disease and most common in Africa, South or Central America, Caribbean islands, Mediterranean countries, India and Saudi Arabia. symptoms include Fatigue, Shortness of breath, Dizziness, Headache, Coldness in the hands and feet, Pale skin, Chest pain.

Thalassaemia:

Thalassaemia is an inherited blood disorder which cause the body to make fewer healthy red blood cells and less haemoglobin. The two major types of thalassaemia are alpha- and beta thalassaemia. The most severe form of alpha thalassaemia is known as alpha thalassaemia major or hydrops fetalis, while the severe form of beta thalassaemia is known as thalassaemia major or Cooley's anaemia. Thalassaemias affect both males and females and occur most often in people of Italian, Greek, Middle Eastern, Asian, and African descent. Haemoglobin in red blood cells has two kinds of protein chains: alpha globin and beta globin. If your body doesn't make enough of these protein chains, red blood cells don't form properly and can't carry enough oxygen. Genes control how the body makes haemoglobin protein chains. When these genes are missing or altered, thalassaemias occur. Thalassaemias are passed on from parents to their children through genes.

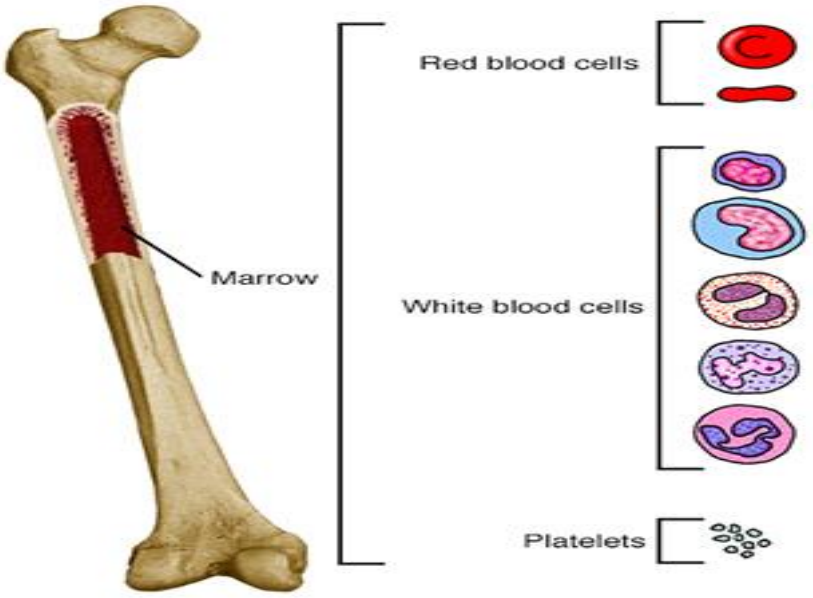


Symptoms:
Symptoms of thalassaemias are caused by a lack of oxygen in the blood stream. The severity of symptoms depends on the severity of the disorder. People who have alpha or beta thalassaemia can have mild anaemia, People with beta thalassaemia intermedia have mild to moderate anaemia. They may also have other health problems including slowed growth and delayed puberty, bone problems and an enlarged spleen. People with

haemoglobin H disease or beta thalassaemia major have severe thalassaemia and other serious health problems Pale and listless appearance, Poor appetite, Dark urine, Slowed growth and delayed puberty, Jaundice, Enlarged spleen, liver and heart, Bone problems. Three "standard treatments" are used to treat moderate and severe forms of thalassaemia, these include blood transfusions, iron chelation therapy, and folic acid supplements.

Aplastic Anaemia:

Aplastic anaemia is a blood disorder in which the body's bone marrow doesn't make enough new blood cells. This may result in a number of health problems including arrhythmias, an enlarged heart, heart failure, infections and bleeding. Damage to the bone marrow's stem cells causes aplastic anaemia (Scheinberg and Young, 2012). A number of acquired diseases, conditions, and factors can cause aplastic anaemia including Toxins, such as pesticides, arsenic, and benzene, Radiation and chemotherapy, Medicines such as chloramphenicol, Infectious diseases such as hepatitis, Epstein-Barr virus, cytomegalovirus, parvovirus B19, and HIV, Autoimmune disorders such as lupus and rheumatoid arthritis. Inherited conditions, such as Fanconi anaemia, Shwachman-Diamond syndrome, dyskeratosis and Diamond-Blackfan anaemia may also cause aplastic anaemia (Brodsky and Jones, 2005). The most common symptoms of aplastic anaemia are Fatigue, Shortness of breath, Dizziness, Headache, Coldness in your hands or feet, Pale skin, gums and nail beds, Chest pains. Treatment for aplastic anaemia includes blood transfusions, blood and marrow stem cell transplants, and medication. These treatments can prevent or limit complications, relieve symptoms, and improve quality of life. Blood and marrow stem cell transplants may cure the disorder.



Causes of anaemia:

A normal balanced diet will usually contain enough iron for your body's needs. The low dietary intake of iron, folic acid and food stuffs that promote iron absorption, coupled with poor bioavailability of iron are the major factor responsible for very high prevalence of anaemia (Prema, 1989 & 1992). Poor iron stores at birth (Kilbridge et al.,1999), low iron content of breast milk and low dietary iron intake through infancy and childhood results in high prevalence of anaemia in childhood (Toteja and Singh, 2004; Kapur et al., 2002).

Nutritional Treatment of Anaemia:

Treating anemia is a matter of how much food we eat that aid in hemoglobin synthesis. In general, to treat anemia, focus should be placed on foods that are good sources of iron, copper, zinc, folic acid, Vitamin B-12 and protein. The combination of iron and B-vitamins is especially good for treating anemia.

4.1 VITAMIN B12: Low levels of vitamin B12 can lead to pernicious anemia. This type of anemia often is treated with vitamin B12 supplements. Food sources of vitamin B12 include Breakfast cereals with added vitamin B12, Meats such as beef, liver, poultry, and fish, Eggs and dairy products (such as milk, yogurt, and cheese), Foods fortified with vitamin B12, such as soy-based beverages and vegetarian burgers
.
4.2 Folic Acid Folic acid (folate) is a form of vitamin B that's found in foods. Your body needs folic acid to make and maintain new cells. Folic acid also is very important for pregnant women. It helps them avoid anemia and promotes healthy growth of the fetus.Good sources of folic acid include Bread, pasta, and rice with added folic acid, Spinach and other dark green leafy vegetables, Black-eyed peas and dried beans, Beef liver, Eggs, Bananas, oranges, orange juice, and some other , fruits and juices.

4.3 Vitamin C Vitamin C helps the body absorb iron. Good sources of vitamin C are vegetables and fruits, especially citrus fruits. Citrus fruits include oranges, grapefruits, tangerines, and similar fruits. Fresh and frozen fruits, vegetables, and juices usually have more vitamin C than canned ones. Other fruits rich in vitamin C include kiwi fruit, strawberries, and cantaloupes. Vegetables rich in vitamin C include broccoli, peppers, Brussels sprouts, tomatoes, cabbage, potatoes, and leafy green vegetables like turnip greens and spinach.

5. Foods to Eat For Anemia Anemia is characterized by the deficiency of the quality and quantity of hemoglobin, a molecule found in the red blood cells. Hemoglobin is important as it carries oxygen from the lungs to the tissues in the human body. When the hemoglobin is unable to carry oxygen to the body's tissues, the body develops anemia. An individual who has anemia may experience symptoms such as incessant fatigue, insomnia, dizziness, pale skin, shortness of breath, a loss of regular menstrual cycle and an unusually rapid heartbeat.

5.1 Fruits Fruits such as iron-rich apples and tomatoes are great to eat when treating anemia. Other fruits that effectively treat anemia are plums, bananas, lemons, grapes, raisins, oranges, figs, carrots and raisins when eaten in large quantities.
,
.2 Honey Honey is a potent source of iron, copper and manganese. When these elements are combined they aid in hemoglobin synthesis. Honey is therefore a powerful weapon against anemia. 5.3 Meats Red meats such as kidney, heart and liver are effective at treating anemia. Also poultry, fish and oyster are effective against anemia. 5.4 Vegetables Vegetables such as spinach, lettuce, beet, broccoli, fenugreek, celery and kale are iron-rich, energy-filled vegetables that treat anemia effectively. These vegetables are not only rich in iron but also Vitamin B-12 and folic acid, energy-boosting nutrients that the body needs to heal from anemia. Beetroot juice is an iron-rich vegetable juice that those suffering from anemia can drink as a tonic against fatigue and lethargy. 5.5 Legumes And Nuts Legumes and nuts such as pulses, almonds, whole grain cereals, dry dates, peanuts and walnuts are effective against the symptoms and causes of anemia. Conclusion Anaemia is the important global health risk factor faced by the teenagers and pregnant women.

a)**Balanced diet rich in Iron**

Adolescence is a significant period for physical growth and sexual maturation. Adolescents need to eat a balanced diet i.e. a diet that provides all nutrients (carbohydrates, proteins, fats, vitamins and minerals) in required amounts and proportions for maintaining health and general well-being.

Eating a balanced diet means consuming different types of food items like pulses, chapatti or rice, green vegetables, locally available fruits and milk every day.

Functions of various food components and why it is important for adolescents:

- Proteins are required for body building and help in repair and maintenance of body tissues. Egg, milk,

pulses, fish, meat, ground nut are some examples of body building foods.

- Fats are high-energy foods and provide fat-soluble vitamins. Oil, ghee, butter, cheese, egg, fat of meat, fish, ground nut oil, and mustard oil are some examplesof fat.
- Carbohydrates form the major component of most diets and are the main source of energy. Rice, potato, sugar, banana, jaggery, sugarcane, honey are the examples.
- Vitamins and minerals are required in small quantities. They play an important role in growth, repair and regulation of vital body functions. Fruits and vegetables are the examples of protective food.
- Calcium needs during adolescence is greater in adolescence because of rapid increase in lean body mass and skeletal growth. Milk and milk products are rich source of calcium.

Foods rich in iron are

(i) Green vegetables and fruits
(ii) Grains-wheat, jowar, bajra, sprouted pulses, ground nut, sesame, jaggery,dried fruits
(iii) Liver, egg, fish,meat
(iv) Vitamin C rich foods help in absorption of iron. Citrus fruits (oranges, lemon),.

IRON RICH COMMOM FOODS

In our Indian diets, the absorption of iron from the diet is poor because of the presence of certain chemical substances. For example tannin in tea can hamper the absorption of iron. On the other hand vitamin C and vitamin C rich foods like amla.

(Indian gooseberry, lime juice, oranges, and sprouts) improve iron absorption. Thus tea,coffee or soda containing drinks should not be consumed immediately before or at least two hours after a meal. Adding Vitamin C rich foods to the meal should be encouraged.

Iron Supplementation:

In India, the poor absorption of iron and a predominantly vegetarian diet means that despite the consumption of a balanced diet, iron supplementation is required to prevent and control anaemia. Anaemia among adolescents can be prevented by regular consumption of iron and folic acid tablets once a week, ideally 52 tablets in a year. This is the basis of the WIFS programme launched by the Ministry of Health and Family Welfare- Government of India has the Weekly Iron and Folic Acid Supplementation (WIFS). This programme addresses nutritional anaemia among adolescents (age group of 10-19 years). This programme will be implemented pan India both rural and urban areas. It will focus on:

- **Administration of weekly iron-folic acid supplements (WIFS).**One IFA tablet containing 100mg elemental iron and 500 microgram Folic acid administered on a fixed day through supervised consumption for 52 weeks in a year.

- **Screening of target groups for moderate/severe anaemia and referring these cases** to an appropriate health facility.
- **Biannual Albendazole (400mg) for de-worming** given six months apart, forcontrol of worm infestation.
- **Information and counseling** for improving dietary intake and for taking actionsfor prevention of intestinal worm infestation.

Where do we get Iron from?

There are two types of dietary Iron:

Haem Iron

This iron is easy for our body to use. Haem iron is in meat, chicken, fish and shellfish.

FISH
especially mackerel, tuna and anchovies

SHELLFISH
especially mussels, clams and cockles

RED MEAT AND CHICKEN
The redder the meat, the more iron it has

Non- Haem Iron

This iron is harder for our body to use meaning we get less iron from it. Non-haem iron includes all vegetarian sources.

NUTS + SEEDS
Especially almonds, cashews, pumpkin seeds

EGGS

FORTIFIED FLOUR
In breads, cereals, and roti

BEANS AND LEGUMES
Especially mung/dahl and kidney beans

FRUIT
especially lychees, figs, tarawau, mangosteen and dried fruit

GREEN LEAFY VEGETABLES

Watercress Rourou Tubua/Chauraiya Bele Saijan Ota

The Helpers

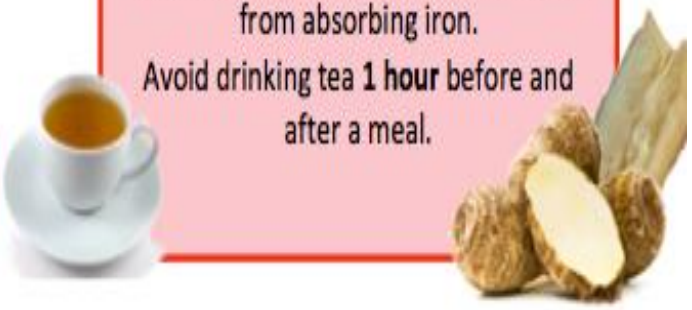
Eating **Vitamin C** can double the amount of iron your body absorbs.

We can get Vitamin C from tomatoes, fruits and bright vegetables (including chilli's)

The Blockers

Tea, cassava and dalo contain tannins and phytates that can block your body from absorbing iron.

Avoid drinking tea **1 hour** before and after a meal.



COMMOM IRON RICH FOODS			
CHANA SAG		**SPINACH**	
KANTEWALI CHAULAI		**ONION STALKS**	
MUSTARD LEAVES		**FENUGREEK LEAVES (METHI)**	
MINT		**ARVI KA SAG**	

10 – 12 years Adolescent girl
Menu Early morning : 1 glass milk (200 ml) + 1 – 2 tsp sugar Breakfast: 2 vegetable stuffed parantha (any) /2 -3 dosas stuffed with potato vegetable / 2 bread slices with butter / 4 idlis with coconut chutney/ 1 cup vegetable upma + 1 cup tea (with 1 – 2 tsp sugar) Mid-morning : 1 fruit like banana, apple, guava etc Lunch : 3 rotis or 1 ½ katori cooked rice or 2 roti and ½ katori rice + 1 katori any green leafy vegetables (cooked in 1 tsp oil) + 1 katori any cooked dal or sprouts(cooked in 1 tsp oil) + 1 katori dahi (200 ml) like aloo raita or carrot raita etc Tea : 1 cup tea (with 1 – 2 tsp sugar) + 1 rusk or 1 biscuit or aloo chatDinner: 3 rotis or 1 ½ katori rice or 1 roti and ½ katori rice + 1 katori any cooked dal/pulses vegetables (cooked in 1 tsp oil) + 1 katori any vegetable (cooked in 1 tsp oil)

13 – 18 years Adolescent girl
Early morning : 1 glass milk (200 ml) + 1 – 2 tsp sugar Breakfast: Breakfast: 2 vegetable stuffed parantha (any) /2 -3 dosas stuffed with potato vegetable / 2 bread slices with butter / 4 idlis with coconut chutney/ 1 cup vegetable upma + 1 cup tea (with 1 – 2 tsp sugar) Mid-morning : 1 fruit like banana, apple, guava etc Lunch : 3 rotis or 1 ½ katori cooked rice or 2 rotis and ½ katori rice + 1 katori green leafy vegetables (cooked in 1 tsp oil) + 1 katori cooked dal or sprouts (cookedin 1 tsp oil) + 1 katori dahi (200 ml) like aloo raita or carrot raita etc or 1 katori paneer sabji Tea : 1 cup tea with 1 – 2 tsp sugar) + 2 rusk or 2 biscuit or ½ katori aloo chaat Dinner: 3 rotis or 1 ½ katori rice or 2 roti and ½ katori rice + 1 katori cooked dal/pulses vegetables (cooked in 1 tsp oil) + 1 katori any vegetable (cooked in 1 tsp oil)

13 – 18 years Adolescent Boys

Early morning : 1 glass milk (200 ml) + 1 – 2 tsp sugar

Breakfast: 3 aloo ka parantha/ vegetable stuffed parantha (any) /3 rotis + 1 katori paneer sabji or aloo sabji/ 4 bread slices with butter /3-4 dosas stuffed with potato vegetable / 5-6 idlis with coconut chutney/ 2 cup vegetable upma + 1 cup tea (with 1 –2 tsp sugar)

Mid-morning : 1 fruit like banana, apple, guava etc

Lunch : 4 rotis or 1 ½ katori cooked rice or 2 rotis and ½ katori rice
+ 1 katori green leafy vegetables (cooked in 1 tsp oil) + 1 katori cooked dal or sprouts (cooked in 1 tsp oil) + 1 katori dahi (200 ml) like aloo raita or carrot raita etc or 1 katori paneer sabji

Tea : 1 cup tea with 1 – 2 tsp sugar) + 2 rusk or 2 biscuit or 1 katori aloo chaat Dinner: 4 rotis or 1 ½

katori rice or 2 roti and ½ katori rice
+ 1 katori cooked dal/pulses vegetables (cooked in 1 tsp oil) + 1 katori any vegetable(cooked in 1 tsp oil)

13 – 18 years Adolescent girl
Early morning : 1 glass milk (200 ml) + 1 – 2 tsp sugar Breakfast: Breakfast: 2 vegetable stuffed parantha (any) /2 -3 dosas stuffed with potato vegetable / 2 bread slices with butter / 4 idlis with coconut chutney/ 1 cup vegetable upma + 1 cup tea (with 1 – 2 tsp sugar) Mid-morning : 1 fruit like banana, apple, guava etc Lunch : 3 rotis or 1 ½ katori cooked rice or 2 rotis and ½ katori rice + 1 katori green leafy vegetables (cooked in 1 tsp oil) + 1 katori cooked dal or sprouts (cooked in 1 tsp oil) + 1 katori dahi (200 ml) like aloo raita or carrot raita etc or 1 katori paneer sabji Tea : 1 cup tea with 1 – 2 tsp sugar) + 2 rusk or 2 biscuit or ½ katori aloo chaat Dinner: 3 rotis or 1 ½ katori rice or 2 roti and ½ katori rice + 1 katori cooked dal/pulses vegetables (cooked in 1 tsp oil) + 1 katori any vegetable (cooked in 1 tsp oil)

13 – 18 years Adolescent Boys

Early morning : 1 glass milk (200 ml) + 1 – 2 tsp sugar

Breakfast: 3 aloo ka parantha/ vegetable stuffed parantha (any) /3 rotis + 1 katori paneer sabji or aloo sabji/ 4 bread slices with butter /3-4 dosas stuffed with potato vegetable / 5-6 idlis with coconut chutney/ 2 cup vegetable upma + 1 cup tea (with 1 –2 tsp sugar)

Mid-morning : 1 fruit like banana, apple, guava etc

Lunch : 4 rotis or 1 ½ katori cooked rice or 2 rotis and ½ katori rice
+ 1 katori green leafy vegetables (cooked in 1 tsp oil) + 1 katori cooked dal or sprouts (cooked in 1 tsp oil) + 1 katori dahi (200 ml) like aloo raita or carrot raita etc or 1 katoripaneer sabji

Tea : 1 cup tea with 1 – 2 tsp sugar) + 2 rusk or 2 biscuit or 1 katori aloo chaatDinner: 4 rotis or 1 ½

katori rice or 2 roti and ½ katori rice
+ 1 katori cooked dal/pulses vegetables (cooked in 1 tsp oil) + 1 katori any vegetable(cooked in 1 tsp oil)

ANTI-ANEMIC DRUGS

Drugs effective in iron deficiency and other hypochromic anemias:

Iron
Pyridoxine ,
Riboflavin , Copper and others

Drugs effective in megaloblastic anemia:

Vitamin B_{12}
Folic Acid

Hematopoietic growth factors:

Erythropoietin

8

MATERIALS AND METHODS

MATERIALS AND METHODS

Blood sample of 70 pregnant women were collected.The samples were further divided to carry out their test using different available techniques. The tests were included:

1) Hemoglobin with target cell: the hemoglobin wasrecorded in both group A & B at different time periods.
2) Serum ferritin, pack cell volume, complete blood count (CBC): the detail is mentioned in table-2.

From the Hb tests of the patients their mean Hb levelwas recorded as 7 to 9 g/dl. The conformational testsalso helped in excluding the patients having other causes of anemia like Thalassemia, B12 deficiency, Folic Acid deficiency.

History was taken carefully from the patients so that to monitor their hypersensitivity to iron dosage and to avoid any major side effects. The selected patientswere divided into two groups A & B, consisting 40 & 30 patients respectively. Group A was provided.

Days	Group A	Group B

0	8.8 ± 1.1 g/dl	8.8 ± 0.9 g/dl
Day 15th	9.5+ 0.5 g/dl	8.9 + 0.2 g/dl
Day 30th	10.2 + 0.8 g/dl	9.0 + 0.4 g/dl

After that Intra-venous therapy was given twice or thrice in a week in infusion form while Intra muscular therapy was given in the form of daily or alternate day injection (2ml/injection). Both the therapies were started with sensitivity dose. Test dose of I.V. iron is 2 inj diluted in 100ml 0.9% NaCl solution and 25ml of this infusion is used as test dose for 25 minutes at the rate of 12 drops per minute [2]. Adverse effects of the doses were observed with the following conditions:

Table-2 Responses of Injectable iron sorbitol given to 30 patients and injection Iron Sucrose Complexes to 40 patients.

formed element of blood total number of the patients presenting in our data in six months were 3205, total number of admitted cases in these six months were 745, out of these 490 were obstetrics department and rest were in the gynecology department. 190 patients had anemia. 70 patients were selected for the injectable iron therapy, iron sorbitol was administrated to 30 patients and rest was on the iron sucrose complex.
Group A was administered with intra venous iron and group B was given intra muscular iron. Depot irons of 500mg were given as additional to replenish the iron stores. Anemia is one of the commonest medical disorders, which occurs during pregnancy in developing countries. It increases the risk of maternal death to 20% and in another 20% it is a predisposing factor [6]. Hemoglobin and Hematocrit begin to rise after three days but the optimal response is achieved in three weeks [7].
During pregnancy there is great demand for iron to meet the requirement for RBC mass expansion in the mother, fetus and placental blood and blood loss at delivery in addition to increased occult gastrointestinal blood loss [8].
Iron demand is to be fulfilled in these cases, Malabsorption and increased demand in pregnancy may be one reason for iron supplementation.

Table-2 Responses of Injectable iron sorbitol given to 30 patients and injection Iron Sucrose Complexes to 40 patients.

formed element of blood total number of the patients presenting in our data in six months were 3205, total number of admitted cases in these six months were 745, out of these 490 were obstetrics department and rest were in the gynecology department. 190 patients had anemia. 70 patients were selected for the injectable iron therapy, iron sorbitol was administrated to 30 patients and rest was on the iron sucrose complex.
Group A was administered with intra venous iron and group B was given intra muscular iron. Depot irons of 500mg were given as additional to replenish the iron stores. Anemia is one of the commonest medical disorders, which occurs during pregnancy in developing countries. It increases the risk of maternal death to 20% and in another 20% it is a predisposing factor [6]. Hemoglobin and Hematocrit begin to rise after three days but the optimal response is achieved in three weeks [7].
During pregnancy there is great demand for iron to meet the requirement for RBC mass expansion in the mother, fetus and placental blood and blood loss at delivery in addition to increased occult gastrointestinal blood loss [8].
Iron demand is to be fulfilled in these cases, Malabsorption and increased demand in pregnancy may be one reason for iron supplementation.

Iron absorption may be adequate in healthy women

Response of Therapy	Iron Sucrose Complex	Iron Sorbitol
Hemoglobin level	11.0	11.0
Days required for Hb correction mean	21	21
MCV	75	74
S/Ferritin	15.2	15.1
Side Effects	Nausia in one patient, Generalized oedema resolved in 3 hrs	Pain and Pigmentation in most of the patients (cases)
Rupees per Course	1500+- 500	170 +-51

- Mild some awareness of the symptoms, and easily tolerated.
- Moderate symptoms causing enough discomfort to interfere normal activity.
- Sever, significantly side effect with respect to the patient.
- Serious life threatening / permanently disabling.

RESULTS AND DISCUSSION:

A temporary anemia during pregnancy may occur. The factor involved in its causation includes increased demand and dietary, especially folate, vit B12 and iron. Table-1 shows the concentration of

depleted of deficient pregnant women.

Injectable iron sorbital was given to 30 patients and injection Iron Sucrose Complex to 40 patients. Responses were calculated as shown in the Table-2

CONCLUSION:

It has been observed that daily iron loss occur is about 2-3mg / day in normal healthy female while in pregnancy this demand is increased to meet the requirement of fetus. The iron losses must be balanced by the intake of iron in the food. The average intake of iron in developed countries is
round 10-15mg / day and in normal condition only 2-3 % is absorbed orally[7]. Intra venues iron is safe more effective and user friendly in the treatment of iron deficiency. It's cost effective when its effectiveness is compared with that of alternate iron therapies and by eliminating the need of blood transfusion, especially in sever iron deficiency anemia in pregnancy.
Injectable iron sorbitol is already in practice since 25 years after the failure of Injection Imferon, because of anaphylactic reaction. Our patients are more worried about the pain due to the injection which is to be given repeatedly while they don't bother about the pigmentation contrary to the other countries [10]. Majority of our population is illiterate, unemployed and resident of villages. These factors individually and cumulatively effect our decisions in the management plans of different patients.

Reference:

1 Brodsky, R.A. and Jones, R.J., 2005. Aplastic anaemia. Lancet. 365(9471):1647-56.Ezzati, M, Lopus, A.D., Dogers, A., Vander, H.S., Murray C., 2002. Selected major risk factors and global and regional burden of disease. Lancet 360 : 1347-60 Guidelines for the management of iron deficiency anaemia, British Society of Gastroenterology (March 2011)

2..Harper, J.L., Marcel, E.C. and Emmanuel, C. B., 2015. Iron Deficiency Anemia:Practice essentials, Pathophysiology and Etiology.Medscape Ministry of Family and Health Welfare. 2002/2003. District-Level Household Survey. New Delhi, Government of India.

3.Mukherjee, K.L., Ghosh, S., 2012. Medical laboratory Technology. Procedure Manual for Routine Diagnostic Tests. Vol I (Second edition), 263-266.

4.Natasha, S., Yasmin G., 2010. Inkosi Albert Luthuli Central Hospital. Proceedings of South African Thalassaemia Association.

5.Pasricha SR, Flecknoe-Brown SC, Allen KJ, et al; Diagnosis and management of iron deficiency anaemia: a clinical update. Med J Aust. 2010 Nov 1;193(9):525-32.

6.Prema R., 1992. Anaemia in pregnancy. In: Ratnam SS, Bhasker Rao K, Arulkumaran S, editors. Obstetrics and gynaecology for postgraduates, Vol 1. Madras: orient Longman.42-53.
7.Prema, R., 1989. Nutrition in Pregnancy. In: Gopalan C, Kaur S, editors. Women and nutrition in India, Special Publication No. 5. New Delhi: Nutrition Foundation of India:153-93.
8.Scheinberg, P. and Young, N.S., 2012. How I treat acquired aplastic anemia. Blood. 120(6):1185-96.

9.Toteja, G.S. and Singh, P., 2004. Micronutrient profile of Indian population. New Delhi: Indian Council of Medical Research.

10.Turner MR, Talbot K; Functional vitamin B12 deficiency. Pract Neurol. 2009 Feb;9(1):37-41.U.S. Department of Health & Human Servicehttps://www.nhlbi.nih.gov/health/healthtopics/topics/anemia/
WHO (2004). Micronutrient deficiency: Battling iron deficiency anaemia: the challenge. Available from: http://www.who.int/nut/ida.htm, accessed on April 24, 2008.

11.WHO, 2005. Worldwide prevalence of anaemia 1993–2005 : WHO global database on anaemia / Edited by Bruno de Benoist, Erin McLean, Ines Egli and Mary Cogswell.

12. King, TC. Hematopoietic pathology. In: Elsevier's integrated pathology.Philadelphia (PA):MosbyElsevier; 2007.pp. 263-289.

13.. WHO. Prevalence and diagnosis of iron deficiency anemia: aguide for program manager. Vol. 52. Geneva: WHO, UNICEF;2001. pp. 447-501.

14. World Health Organization. Iron deficiency anaemia: assessment, prevention and control: a guide for programme managers. Vol. 36. Geneva: WHO, UNICEF, UNU; 2001. pp. 314-362.

15. Luzzatto, L. Hemolytic anemias and anemia due to acute blood loss. In: Kasper DL, Fauci AS, Longo DL, Jameson JL, Loscalzo J, editors. Harrison's principles of internal medicine. 19th ed. New York: McGraw Hill; 2015. pp. 649-662.

16. Beutler E, West C. Hematologic differences between AfricanAmericans and whites: the roles of iron deficiency and alphathalassemia on hemoglobin levels and mean corpuscular volume. Blood 2005 Jul;106(2):740-745.

17. Lee, GR. Pernicious anemia and other causes of vitamin B12 cobalamin deficiency. In: Lee GR, Foerster J, Lukens J,

18.Paraskevas F, Greer JP, Rodgers GM, Baron JM, editors. Wintrobe's clinical hematology. 10th ed. Baltimore (MD): William.

19.)1 Sash L and Donna C (1994). A demographic portrait of South & South East **Asia. Washington D.C: Population Reference Bureau. 10-16.**
20) Worwood M and Ferritin S (1980). In: Cook JD, ed. Iron. New York: Churchill Livingstone.(Chanarin I, Beutler E, Brown EB, Jacobs A, eds. Methods in hematology; 1: 59-89.

21)Hallberg L, Hogdahi AM, Nilsson L and Rybo G (1966). Menstrual Blood Loss, a population study variation at different ages and attempts to define normality. Acta Obstet. Gynaecolo. Scand. 45:325-351.
22) Bhatt RB, Joshi SK and Shah MC (1966) Total dose of intramuscular infusion of iron-dextran (imferon) in severe anemia. AM.J. Obstet. & Gynaeecol. 94:1098-1103.
23)Al-Momin AK, Haraib SO, Mitwalli AH, Al- Wakeel J and Abu-Aiha H (1986).

21)Hallberg L, Hogdahi AM, Nilsson L and Rybo G (1966). Menstrual Blood Loss, a population study variation at different ages and attempts to define normality. Acta Obstet. Gynaecolo. Scand. 45:325-351.
22) Bhatt RB, Joshi SK and Shah MC (1966) Total dose of intramuscular infusion of iron-dextran (imferon) in severe anemia. AM.J. Obstet. & Gynaeecol. 94:1098-1103.
23)Al-Momin AK, Haraib SO, Mitwalli AH, Al- Wakeel J and Abu-Aiha H (1986). Intravenous Iron Sucrose Complex and haemodialysis patients receiving r-Hu EPO. Saudi J. Kidney Transplant. 5: 168-172.

24)Sogbanmu MO (1986). Anemia of pregnancy treated with total infusion of Iron Polymaltose complex. Tefferol current therapy. Clin Exp. 21:149-155.

25)Breymann C, Fibach E and Visca E (1999) J. Maternal and Fetal Medicine 8:1-7.

26)Al-Momin, Al-Meshari AA et al (1996). Intra venous iron sucrose complex in the treatment of iron deficiency anemia during pregnancy. Eur. J. Obst. Gynaecol. And Reproductive biology. 69: 121-124.

27) Johnson CA (1999). Intravenous iron Products. ANNA J. 26:522-524.

28) Idjradinata P and Polbtt E (1993). Reversal of developmental delays in iron deficient anemic infants treated with iron. Lancet. 314: 1-4.