



“ANEMIA UNVEILED: TYPES AND HERBAL SOLUTIONS FOR HEALTHIER BLOOD”

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Abstract : Anemia is a chronic blood condition marked by a deficiency of red blood cells or hemoglobin, which lowers the body's capacity to carry oxygen, which causes weakness and fatigue. This review goes over a number of anemia-related topics, such as types, causes, and symptoms. There are several different types of anemia, each with a distinctive etiology and clinical appearance. These include iron deficiency anemia, vitamin deficiency anemia, aplastic anemia, and hemolytic anemia. Timely diagnosis and therapy of symptoms like exhaustion, paleness, dyspnea, and vertigo depend heavily on the ability to identify them. This review covers herbal remedies for anemia in addition to conventional treatments, highlighting homeopathic treatments that have demonstrated potential in promoting healthy blood. Understanding the subtleties of anemia and exploring herbal remedies can enhance a comprehensive strategy for managing this common ailment, possibly providing supplementary or different options for enhancing hematologic well-being.

Key words- Anemia, Iron Deficiency, Hemoglobin, Fatigue, Hematologic Well-being, Etiology.

INTRODUCTION

Although iron deficiency seems to be the most prevalent cause of anemia worldwide, anemia may also be triggered by other nutritional deficiencies, such as those in magnesium, folate, and vitamin B12. A condition called anemia develops when there are not sufficient red blood cells in the body to meet its needs for oxygen transportation. physiological requirements. A person's gender, age, residential elevation above the sea level (altitude), smoking regularity, and additional variables all affect their specific physiological needs. Nevertheless, even though iron deficiency is not the only cause of anemia, the concentration of hemoglobin should still be evaluated. (1) Anemia prevalence is a major health indicator, and the amount of hemoglobin can reveal information about the severity of iron lack when paired with other iron status examinations. (WHO, 2007). This occurs when hemoglobin (Hb) concentration level is lower than 11g/ dl for pregnant women and children six month to five years of age, 12g/dl for children 6-14 age and 13g/dl for men. Anemia causes serious health problems like impaired mental and psychomotor development, reduced work performance, increased susceptibility to parasitic infections (decreased immunity), growth retardation in children and in severe cases increased rate of child and maternal mortality. (MK, 2011). Two billion people worldwide suffer from anemia, with a significant proportion originating from South Asia, according to WHO research. Approximately half (47.4%) of all Anemia affects 41.8% of pregnant women and preschool-aged children. (Badham J, 2007). Now a day, there is not enough compiled information about the major causes of anemia, and its simplest prevention mechanism. Therefore, the aim of this paper is to review the major causes of anemia and to suggest the simplest way of anemia prevention mechanism.

A. TYPES AND CAUSES

Anemia can be classified into a number of different kinds. Aplastic anemia, megaloblastic anemia, iron deficiency anemia, hemoglobin synthesis, genetic maturation problems(thalassaemia) and physical loss of red blood cells are only a few of the red cell disorders that can cause anemia. (hemolytic anemia) in cells. (Mukherjee, 2012)

A.1. Iron-Deficiency Anemia

The body needs iron for a number of functions, including the production of hemoglobin. Iron deficiency anemia is the name given to anemia brought on by low iron levels in the blood. Premenopausal women and teenagers are more likely to suffer from this type of anemia. Excessive blood donation, internal gastrointestinal bleeding, and heavy monthly bleeding can all worsen this disease. Low iron levels are the cause of anemia, which can arise for a variety of causes. Anemia caused by iron shortage, heavy menstrual cycles, insufficient iron absorption, gastrointestinal bleeding, dietary factors (iron deficiency or restricted diet), medications (aspirin, ibuprofen, naproxen, and diclofenac), and other factors is primarily caused by pregnancy or childhood growth spurts. lack of certain vitamins (including folic acid and vitamin B12), renal haemorrhage, problems with the bone marrow, problems with red blood cells, and hookworm infection. (Harper, 2015)

A.2. Pernicious anemia

Pernicious anemia is the most common cause of a vitamin B12 deficiency. Vitamin B12 is essential for life. It is necessary for the body to produce new cells, including the many red blood cells that are produced every day. Milk, eggs, fish, and meat are all excellent sources of vitamin B12. A deficiency of vitamin B12 and, on occasion, other factors might cause anemia. B12 deficiency, or low vitamin B12 intake, can cause anemia. Pernicious anemia usually manifests after the age of fifty. Generally speaking, it runs in families, with men being less likely than women to be affected. Individuals who also have other autoimmune conditions are more susceptible to it. A number of drugs may also have an impact on vitamin B12 absorption. Anticonvulsants used to treat epilepsy, metformin, colchicine, and neomycin are among the most common examples. (Turner MR, 2009)

A.3. Haemolytic Anemia

When a person has hemolytic anemia, their red blood cells are removed from the body before they can finish their normal life cycle. Hemolytic anemia can strike people of any age, gender, or race. weariness, discomfort, arrhythmias, hereditary spherocytosis, hereditary elliptocytosis, an enlarged heart, and glucose-6-phosphate Hemolytic anemia can cause pyruvate kinase insufficiency and dehydrogenase (G6PD) deficiency, among other health problems. Hemolytic anemias that are acquired include paroxysmal nocturnal hemoglobinuria, drug-induced hemolytic anemia, autoimmune hemolytic anemia, alloimmune hemolytic anemia, mechanical hemolytic anemias, and others. Furthermore, certain medical conditions and medications may cause hemolytic anemia. (Natasha, 2010)

A.4. Sickle cell anemia

Sickle Cell anemia is a kind of anemia where the body produces sickle-shaped ("C") red blood cells. It contains aberrant hemoglobin that has a sickle shape and makes it difficult for the blood to flow through blood vessels. Sickle cell clusters obstruct blood flow to the limbs and organs. Organ damage, severe infections, and discomfort are all results of blocked blood arteries. Sickle cells typically expire after 10 to 20 days, and because the body cannot make enough red blood cells to replace the ones that are dying, anemia results.

A.5. Thalassaemia

The thalassaemia genetic blood disease causes the body to produce less hemoglobin and fewer healthy red blood cells. The two primary types of thalassaemia are beta- and alpha-thalassaemia. Cooley's anemia is the most severe form of beta thalassaemia, and alpha thalassaemia is the most severe form of thalassaemia. severe thalassaemia or hydrops fetalis. Thalassemsias can affect both sexes, and those of Italian, Greek, Middle Eastern, Asian, and African descent are the most likely to have them. The two distinct kinds of protein chains that make up hemoglobin in red blood cells are beta and alpha globin. Your body needs these protein chains in order for red blood cells to form correctly and carry enough oxygen. The body's production of haemoglobin protein

chains is governed by genes. Thalassaemias develop when these genes are absent or changed. Thalassemsias are inherited genetically from parents to their offspring. (P, 2016)

A.6. Aplastic Anemia

Numerous acquired diseases, conditions, and exposure to poisons such as pesticides, arsenic, and benzene can cause aplastic anemia. radiation and chemotherapy, Among the infectious diseases are CMV, Epstein-Barr virus, hepatitis, and Lupus, rheumatoid arthritis, HIV, parvovirus B19, and drugs like chloramphenicol are examples of autoimmune illnesses. Inherited conditions such Fanconi anemia, Shwachman-Diamond syndrome, dyskeratosis, and Diamond-Blackfan anemia can also result in aplastic anemia. The most common symptoms of aplastic anemia include headaches, weariness, disorientation, cold hands and feet, pale skin, gums, and nail beds, as well as chest pains. Aplastic anemia is treated with medications, bone marrow stem cell transplants, and blood transfusions. These treatments can improve quality of life, diminish issues, and lessen symptoms. (Brodsky, 2005)

B. Major Causes of Anemia

Low socioeconomic position, dietary inadequacies, helminthes infections and other infectious diseases, illiteracy, and blood disorders like sickle cell anemia are among the many causes of anemia. (Bank, 1980) (Menendez C, 2000) The major causes in the societies are iron deficiency, hookworm infection, foliate deficiency, and malaria. (. Fleming AF, 1987) In the current review the main causes of anemia: nutritional deficiency and parasitic infections are discussed.

B.1.Nutritional deficiency

A person is considered to be nutritionally deficient if their daily intake of nutrients is regularly lower than what is advised. Approximately 1,200 million teenagers experience inadequate nutrition, which hinders their growth and development. (Badham J, 2007) Anemia, which is the most common health issue in both industrialized and poor nations, can be brought on by nutritional inadequacies. Iron deficiency anemia is among the forms of anemia brought on by dietary deficiencies. Acute vitamin B12 insufficiency with insufficient folic acid. (Hahn JS, 1988)

B.2.Vitamin B deficiency

Anemia can result from a vitamin B-complex shortage in the diet. A deficiency in vitamin B6 has been linked to anemia because it is necessary for the production of hemoglobin, which increases oxygen transfer. a type of anemia brought on by vitamin B6 deficiency and iron deficiency anemia are comparable. The most frequent cause of low B12 stores in early children has been linked to maternal deficiencies, which result in low stores from birth. (V, 1999)

B.3.Folate deficiency

Margo et al. (Margo G, 1978)cited the frequent complication of protein-energy malnutrition as foliate deficiency. Anemia can also result from foliate deficiency, which happens when absorbed foliate falls short of requirements over time, much like other dietary deficiencies. (Fleming AF, 1928) Folate deficiency causes anemia because it is required for the bone marrow to produce red blood cells typically, which causes red blood cells to distort and decrease in production. (AF, 1989) The problem could stem from the elevated need for foliate during the pregnancy and breastfeeding periods. Up to one-third of pregnant women internationally may have decreased levels of foliate stored in their tissue. (FAO/WHO, 1970)

B.4.Vitamin A deficiency

Because vitamin A is necessary for the metabolism of iron and the synthesis of red blood cells, a shortage in this vitamin can lower hemoglobin levels and cause anemia. (Hahn JS, 1988) via controlling the way iron is stored in tissue, how much of it is released into the bloodstream, and how red blood cell formation and production are directly regulated. (Badham J, 2007)

C. Symptoms of Anemia (N, November-2016) (CA, 1998)

You might not even notice the symptoms of anemia because they might be so subtle. Symptoms usually appear as your blood cell count starts to drop. symptoms could consist of:

1. Dizziness, lightheadness, or feeling like you are about to pass out
2. Fast or unusual heartbeat
3. Headache
4. Pain, including in your bones, chest, belly, and joints
5. Problems with growth, for children and teens
6. Shortness of breath
7. Skin that's pale or yellow
8. Cold hands and feet
9. Tiredness or fatigue

D.Mechanism of action anemia

Diagrammatic representation of the primary processes of iron shortage and anemia in cancer patients. Absolute iron deficiency (ID) is brought on by blood losses from tumor growth (particularly in gastrointestinal tumors) or after surgery, which may be made worse by concurrent coagulopathy and inadequate iron intake from malnourishment and cachexia. Hepcidin production in the liver is increased by inflammation, which results in functional ID. (Y, 2012) Functional identification may be aided by treatment with erythropoiesis stimulating drugs, which identify differences between the iron storage and the body's requirement for erythropoiesis. Other causes of anemia in cancer patients include tumor cell invasion of the bone marrow, myelosuppression brought on by chemotherapy or radiation therapy, and concurrent chronic kidney disease (CKD). (Fabiana Busti, 2018)

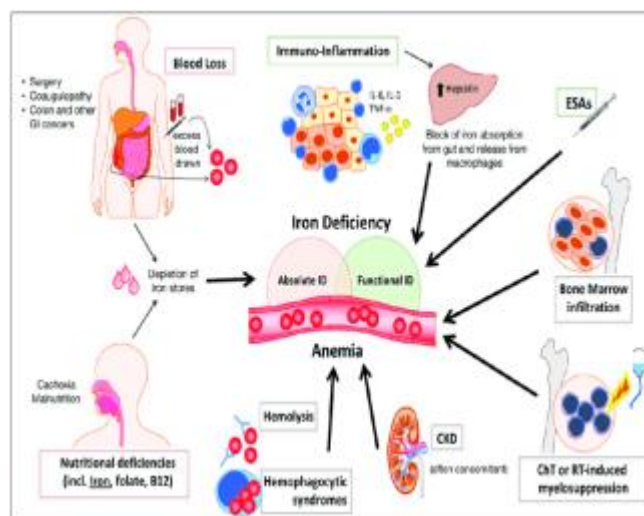


Fig.1. General mechanism of anemia.

E. Anemia Prevention and Control

Worldwide, there is a need for the cost-effective prevention and control of anemia due to the major health issues it brings about. Treatment of the root cause, restoration of normalcy, and other well-documented measures are among the many affordable therapies against anemia. Of the hemoglobin concentration to suitable ranges, as well as the avoidance and management of consequences. (Osungbade KO, 2012) Although there are other ways to give people more iron, the most effective ones are food fortification and dietary variety to avoid being iron deficient. (Organization, 2005) However, the World Health Organization advises regular vitamin A supplementation during pregnancy or at any other time in locations where vitamin A deficiency has been identified. The period of time during lactation. (ACC/SCN, 2001) The World Health Organization (WHO), United Nations Children's Fund (UNICEF), and the International Nutritional Anaemia Consultative Group (INACG) advised specific control measures, such as managing hookworm and other helminthic infections, including hygienic feces disposal and educational campaigns on using latrines correctly Eliminating water-dwelling snails, which act as natural storage of schistosomes, can prevent all kinds of schizophrenia, including

intestinal and urinary variants. (ACC/SCN, 2001) (Organization, Report of the WHO informal consultation on hookworm infection and anaemia in girls and women. , 1996)

F. AYURVEDIC APPROACH

Because blood count is so important to overall health, maintaining it is vital. Clear-cut causes such as unintentional bleeding, heavy menstruation, pregnancy, and inadequate nutrition can be addressed appropriately with foods, tablets, tonics, injections, and in the event of a grave condition, blood transfusion may be required. This idea is clear. However, it is not appropriate to continuously use supplements (in the form of pills, tonics, or injections) without eating a normal, nutrient-rich diet to maintain blood counts and hemoglobin levels. In general, food alone can treat 50% of anemia patients; supplements and medications may be required for 30% of them, and blood transfusion and medications may be required for 20% of them. The cell will remain less active or unhealthy even when the substitute is well substituted if the activity of the cell is not able to absorb the same. By treating the underlying cause, homeopathic medications can address the ailment or disease without the need for continuous use. Chronic fatigue is a process that is continuing in anaemia. If complaints are not handled appropriately, they will eventually accumulate. Therefore, it is preferable to identify the root cause and address the issue as needed. To set itself apart from other approaches, homeopathy works by focusing on reality to halt the never-ending anemia episode. The effectiveness of the treatment will increase with its specificity. Ayurvedic medications can increase the body's ability to absorb nutrients, produce new cells, stop damage, and keep levels steady. (Orna, 1991)

MEDICINAL PLANTS USED IN TREATMENT OF ANEMIA

1. Phyllanthus emblica is a plant that belongs to the Euphorbiaceae family; it is also known as Indian gooseberry in English and Amla in Hindi. It is rich in minerals, amino acids, and vitamin C, all of which aid in restoring vigor and vitality. Various plant parts are used to treat a variety of ailments, including diabetes, diarrhea, and anemia.



Fig.2. Phyllanthus emblica

2. Moringa oleifera This plant belongs to the Moringaceae group and is sometimes referred to as drum stick in English and munga in Hindi. According to reports, moringa leaves have a large iron content that reduces anemia in children under the age of two. (Angela E. Shija, 2019)



Fig.3. Moringa oleifera (Angela E. Shija, 2019)

3. Beta vulgaris - It belongs to the Amaranthaceae family and is referred to as beet root in English and Chukandar in Hindi. It contains a significant amount of iron, minerals, and vitamins that raise blood hemoglobin levels, particularly in pregnant women. (J D. Babarykin, 2019)



Fig.4. Beta vulgaris (J D. Babarykin, 2019)

4. Cajanus cajan - Known by the common names Tur/Arhar in Hindi and Pigeon Pea in English, it belongs to the Fabaceae family. It contains a significant amount of iron. It serves as a pulse in every person's typical diet and offers the right nutrition. (Devindra, 2018)



Fig.5. Cajanus cajan (Devindra, 2018)

5. Mangifera indica

Plant parts are utilized for treating diarrhea, dysentery, anemia, asthma, bronchitis, cough, hypertension, insomnia, rheumatism, toothache, leucorrhoea, hemorrhage, and piles. They are also employed as a dentrifice, antiseptic, astringent, diaphoretic, stomachic, vermifuge, tonic, laxative, and diuretic. Any number of conditions can be treated with these parts: abscesses, broken horns, tumors, datura poisoning, heat stroke, miscarriages, anthrax, blisters, mouth wounds, indigestion, diarrhea, glossitis, bacillosis, bloody dysentery, liver disorders, excessive urination, tetanus, and asthma. (OluwasegunModupe., March 2016)



Fig.6. Mangifera indica (OluwasegunModupe., March 2016)

6. *Telfairia occidentalis*

Grown in Nigeria, *telfairia occidentalis* is a significant staple vegetable. The plant yields abundant, vitamin- and iron-rich edible green leaves. The male plant is grown primarily for its leaves and seeds, which are crucial for soup condition. The female plants have long, twisting tendrils that branch off of their stems, and their leaves are divided into three to five leaflets, with the terminal leaflets reaching a length of up to 15 cm. According to recent research, the leaves of *Telfairia occidentalis* are rich in antioxidants, vitamins (including thiamine, riboflavin, nicotinamide, and ascorbic acid), minerals (like iron, potassium, sodium, phosphorus, calcium, and magnesium), and phytochemicals (like phenols). Fluted pumpkins are harvested 120–150 days after seeding. (Cyril-Olutayo, 2018)



Fig.7. *Telfairia occidentalis* (Cyril-Olutayo, 2018)

7. *Brillantaisia nitens*

The leaves are used to methanol treat rheumatism, yaws, and anaemia; the infusion is used to treat stomachaches, menstrual pain, and delivery. It may have analgesic and antiplasmodial properties, according to reports. In a February 2010 publication, Peter Akah et al. examined the and aqueous extract fractions of *Brillantaisia nitens* Lindau leaves. recovers rats from phenylhydrazine-induced anemia. (Akah, feb 2010)



Fig.8. *Brillantaisia nitens* (Akah, feb 2010)

8. *Sorghum bicolor*

Sorghum is a traditional treatment for cancer, epilepsy, flux, and indigestion among other plants used as folk medicine, including antiabortive, cyanogenetic, demulcent, diuretic, emollient, intoxicating, and poison (Duke and Wain, 1981). In southern Rhodesia, the root is used to treat malaria; the seed, to treat diarrhea and breast illness; and the stem, to treat tubercular swellings. The plant is used to treat dermatitis in South Africa when paired with *Erigeron canadense* L., and it is thought to have anthelmintic and insecticidal properties in India (Watt and BreyerBrandwijk, 1962). The seed husk is cooked in brown sugar with a small amount of water in China, where the seeds are extracted to produce alcohol, and then applied to the chests of measles sufferers. It

is believed that the stomachic seeds are advantageous in fluxes (Perry, 1980). Morton (1981) reports that the indigenous people of Curacao drink the leaf decoction to treat measles, and ground the seeds along with those of the calabash tree (*Crescentia*) to treat problems with the lungs. For diarrhea, Venezuelans grind and toast the seeds. Brazilians use the ash to treat goiter and decoct the seed for bronchitis, cough, and other respiratory illnesses. Arubans apply heated oil packs infused with seeds to the backs of those experiencing respiratory congestion. Grieve's Herbal (1931) states that a folk remedy for renal and urinary symptoms is a decoction of about 50 g seed to a liter of water, prepared down to about 1/2 liter. (. M. Sènou, 2016)



Fig.9. Sorghum bicolor (. M. Sènou, 2016)

9.Foeniculum Vulgare

Carminative/stomachic, fragrant, hepatoprotective, somewhat stimulating, slightly estrogenic, galactagogue, diuretic, antiemetic, antianemic, antispasmodic, expectorant, and orexigenic. In a 2018 publication, CHANDRAKANTAKUSHWAH, DEEPANSHU, et al. investigated the anti-anesthetic activity of FOENICULUM VULGARE IS USED HYDRO-ALCOHOLIC EXTRACT SEEDS IN PHENYLHYDRAZINE-INDUCED ANEMIC RATS. (CHANDRAKANTA KUSHWAH, Jan 7, 2018,)



Fig.10. Foeniculum Vulgare (CHANDRAKANTA KUSHWAH, Jan 7, 2018,)

10.Prunus domestica

Prunes are a dried fruit that has both stomachic & bowel movements. The bark is styptic and occasionally used as a febrifuge. A moderate purgative for children has been made from an infusion of the flowers. All members of the genus contain amygdalin and prunasin, which react in water to generate hydrocyanic acid (also known as cyanide or prussic acid), yet no specific reference of this species has been found. When used in moderation, this highly harmful substance promotes breathing, enhances digestion, and elevates mood. (Pawan Goud, july-September 2018)



Fig.11.Prunus domestica (Pawan Goud, july-September 2018)

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