An Analytical Study on Anemia in Rural Population

Shirish Ardhapuskar [1], **Raghu Rammulu** [2]

[1]Professor, Department of General Medicine, GEMS Medical College, Srikakulam, Ragolu, Andhra Pradesh, India, [2]Assistant Professor, Department of General Medicine, SVS Medical College, Mahabub Nagar, Telangana, India.

Abstract

Background: Anemia is one of the common Hematological disorders in India and worldwide. It affects all the age groups both in Males and Females. Moderate to Severe Anemia causes increased morbidity and mortality in elderly patients (AWHO expert group) - According to Worlds Health Organization, Anemia is a define when adults males are having Hemoglobin less than 13.5gr% when adults females non-pregnant less than 12 gr% and when pregnant females are having less than 11 ger%. The incidence of Anemia is very high in old age people who are more than 75 years of age. It ranges from 9% to 41%. In India Anemia is commonly due to nutrition, pregnancy, Hookworm infestation, DUB in the case of females, and Malignancy. The prevalence of anemia in the elderly has been found to range from 9% to 42% with the highest prevalence in 80 years and above. The common causes of anemia in India are Nutritional, Pregnancy, Hookworm infestation, and DUB in the case of Females and Malignancy. The common symptom is General weakness, Fatigue, Lack of concentration, Shortness of Breath, and Palpitations. A WHO expert group proposed that anemia should be considered when hemoglobin level below 13.5gr& in adult males; 12gr% in adults females non-pregnant; 11 gr% in adult female pregnant; 12gr% in children over 14yrs(1). The aim is to evaluate the etiology and clinical features of anemia in adults in rural medical colleges. **Subjects & Methods**: This study is conducted at GEMS Medical College, Srikakulam, A.P for the period of 1 year from April 2018 to March 2019. This study includes 120 patients with Anemia. The age group is between 20 years and 70 years. Males were 56 and females were 64. **Results:** We have conducted this study at GEMS Medical College, Srikakulam for 1 year, from April 2019 to March 2019 total no. of patients included in this study are 120 males 56 and females 64. The age group is between 20 years and 70 years. The maximum patients are in between 30 years and 70 years in both sexes. **Conclusion:** Anemia is a common medical problem in developing countries. In a rural part of India, the disorders will complicate the pregnancy also. So periodical examination and education of the people can decrease morbidity and mortality. In our area still, the common cause is nutritional.

Keywords: Anemia, Hemoglobin, Iron deficiency, Leukemia, Bleeding disorders

Corresponding Author: Raghu Rammulu, Assistant Professor, Department of General Medicine, SVS Medical College, Mahabub Nagar, Telangana, India.
E-mail: drraghuananthoju@gmail.com

Introduction

Anemia is a common hematological problem in developing countries India Srilanka, Bangladesh, and African countries like According to WHO definition Anemia is a decreasing carrying capacity of Hemoglobin.[1] A WHO expert group proposed that anemia should be considered. When Hemoglobin levels below 13.5gr% in adult males; 12 gr/dl in adult females no pregnant; 11gr% in adult females pregnant: 12gr% in children over 14years. It affects all age groups and both sexes. The prevalence of anemia is high in the elderly population from 12 to 42% the highest is in the 7th and 8th decade.[2] Classification of anemias is divided as Pathological and morphological. Pathological classification is 2 types (i) due to decreased RBC eg. Iron deficiency Thallasemias, (ii) is increased RBC

destruction e.g. hemolytic anemia. Morphologically depends on RBC size (i) Microcytic (ii) Macrocytic (Megaloblastic) (iii) normocytic examples of microcytic anemia's are (i) Iron deficiency (ii) Thalassemia's (iii) Anemias of chronic disease. Macrocytic anemia is seen due to Vit B_{12} and Folic acid deficiency.[3] Formed elements of Blood are produced by the process called hematopoiesis, Erythropoietin (EPO) is the primary regulatory hormone for Red cell production. Erythropoietin is produced and released by per-tubular capillary lining cells of the kidney.[4] The common causes of iron deficiency Anemia are nutritional gastrointestinal bleeding (including Bleeding peptic ulcers and hemorrhoids) and CRF. Hookworm infestations and other infections, pregnancy, and Malignaies, Megaloblastic Anomalies is caused by pregnancy, Vit - B12 and Folic acid deficiency, alcoholism, cir-

rhosis of the liver and hemolytic anemias are caused by blood loss, Metabolic defects, Membrane abnormalities, and hemoglobinopathies.[5] The common symptoms include General Weakness easy tiredness, Breathlessness, Lack of Concentration, Palpitations and signs include paler, tachycardia, high volume pulse. Wide pulse pressure and sometimes Murmurs may hear lymphadenopathy and signs of bleeding tendencies may also be seen. In megaloblastic anemia, sensory symptoms may present.[6] Iron is not only an important element in hemoglobin but also other essential elements in the body. Myoglobin, cytochromes, cytochromes oxidase are. The total quality of iron in the body averages 4000mg to 5 grams about 65% of which is in the form of hemoglobin; about 4% is in the form of Myoglobin. In the cell cytoplasm, Iron combines mainly with a protein apoferritin to form Ferritin.[7] Iron is absorbed from all parts of the small intestine, in the form of apo transferrin and transferrin. Anemia is a reduction in the member of a red cell of hemoglobin in the blood that can reflect the impaired synthesis of hemoglobin (eg in iron deficiency); or impaired production of erythrocytes (eg: folic acid, Vit B_{12} deficiency).[8] Three stages of Iron deficiency have been described 1) the first stage characterized by decreased storage of iron without any other delectable abnormalities 2) the Second stage and intermediate stage of latent iron deficiency 3) the Third stage, overt iron deficiency when there is a decrease in the concentration of circulating hemoglobin due to impaired hemoglobin synthesis.[9] Iron is mostly absorbed from the duodenum and small intestine the Factors which decrease absorption of iron are phosphates, a decrease of Jejunum and duodenum. Ascorbic acid increases the absorption of iron. There are different types of chains are designated alpha chains, beta chains, gamma chains, and delta chains. The most important form of hemoglobin in the adult human being A is a combination of 2 alpha chains, 2 beta chains.

Subjects and Methods

We have conducted this study for 1 year from April 2018 to March 2019 in GEM Medical College. AP 120 patients were included in this study. Among the 120 56 were males 64 are females. The age group included is between 20 years 70 years, Maximum no. of patients are in between 50 years and 70 years. After are fully taking the history and clinical examination we have send the blood samples for total count & differential count Hb%, Random blood sugar Serum Keratinize blood urea, LFT, Serum Ferrites, Vit B_{12} & Folic acid estimation, and bone mass and peripheral smear examination. Stool for ora & cyst is also done. We have informed and obtained consent from patients and obtained college ethical committee approval also. Ultrasound abdomen examination and upper GI endoscopy colonoscopy were done in suspected cases. Coombs test is also done.

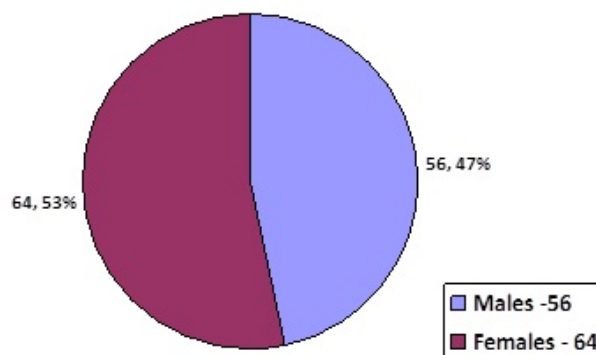The data was computerized and analyzed. Systematically using MS. Office.
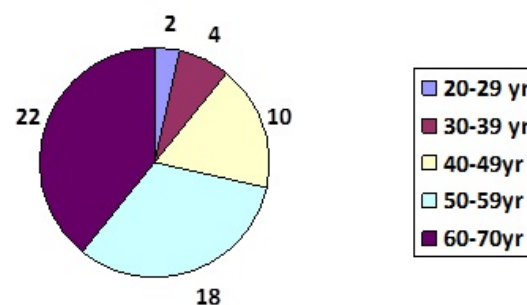

Chart 1: **Sex Wise Distribution**

Chart 2: **Age-Wise Distribution in Males**

The symptoms in orders of frequency are General weakness Fatigue. Shortness of Breath, palpitations, and syncope. The most important signs are pallor, tachycardia, Angular steatites, bounding pulse koilonychia, and lymphadenopathy.

Results

We have examined 120 patients; Males were 56 and Females 64. The common age group is between 20 years and 70 years. In males in the 50 - 60 years age group. 18 patients (32.14%) are 60-70 years. 22 patients (39. 28%) whereas in females in 50-60 years age group 19 patients (29.68%) and in 60-70 years age group 25 patients (38.06%).

The most common symptoms are general weakness and fatigue is seen in 23 male's patients and 20 female's patients.

Table 1: Age, Sex Wise Distribution of Patients

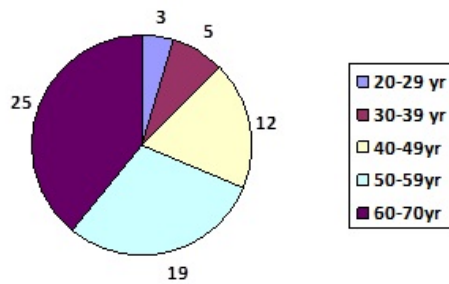| Age in years	Males 54 no. of patients	Percentage	Female 64 no. of patients	Percentage
20 –29 yr	2	3.77%	3	4.68%
30-39 yr	4	7.14%	5	7.81%
49—49 yr	10	17,85%	12	18.75%
59–59 yr	18	32.14%	19	29.68%
60–70 yr	22	39.28%	25	38.06%

Chart 3: **Age-Wise Distribution in Females**
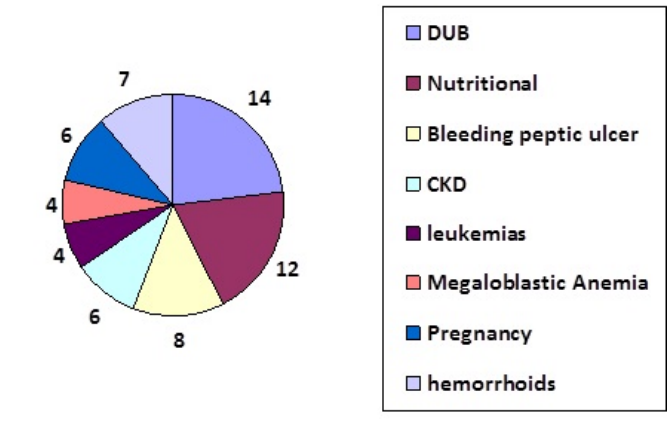
Chart 4: **Hemoglobin Levels**

Table 2: Symptoms in Males and Females

Symptoms	Males Patients (56)	Female Patients (64)
General weakness and fatigue	23 (41.15%)	20 (31.25%)
Breathlessness	6 (10.71%)	8 (12.55%)
Palpitations	6 (10.71%)	9 (7.81%)
Syn cope	4 (7.14%)	5 (7.71%)
Parasthesias	2(3.57%)	2 (3.12%)

Figure 1: Iron Deficiency Anemia

Table 3: Haemoglobin levels.

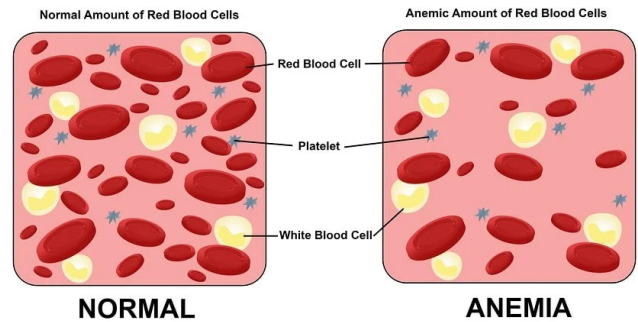| Hb% Levels	Males	Females
11-9 gr. dl	20	36
9-6 gr/dl	25	22
6 gr/dl	9	6

Breathlessness and palpitations are seen in 6 male patients and 8 females' patients. More than 50% of patients both male and female are having mild anemia according to Hb% LEVELS (11-9 gr/dl) and about 30% are having moderate anemia (Hb% 9-6 gr/dl) and <5% are having severe or gross anemia (Hb% is <6 gr/dl). The most common cause of anemia in this study is iron deficiency anemia, next is Megaloblastic Anemia and last is Hemolytic Anemia (78% are having iron deficiency Anemia 18% are having Megaloblastic Anemia and 4% are
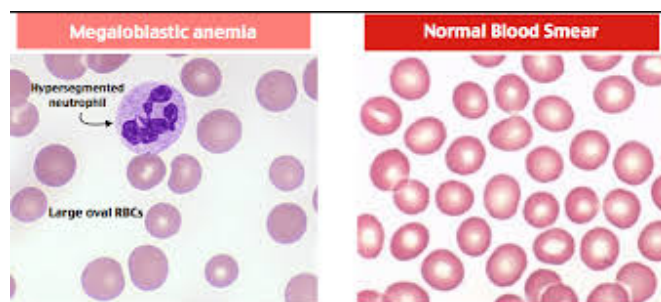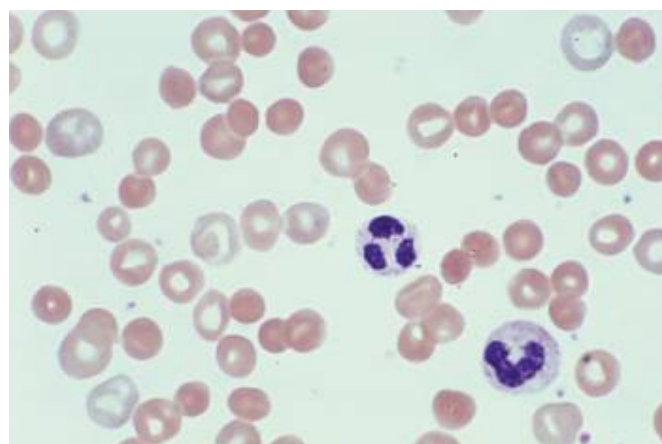
Figure 2: Megaloblastic Anemia

Figure 3: Hemolytic Anemia

having hemolytic Anemia).

Discussion

Anemia is a very common problem. Especially in old age, the prevalence of Anemia is increase as age is increasing to 7th decade and 8th decades, in our study in the 7th decade 39.28% in males and 38.06% in Females.[10] Tettamanti M et al conducted a study on prevalence. It shows 46.5% prevalence in elderly people. Anemia is classified according to the pathophysiologic basic, whether related to increased production (reticulocytosis) or decreased production (reticulocytopenia) and according to RBC size. Reticuloytosis occurs in one of three pathophysiologic states; 1) acute blood loss 2) recent replacement of erythropoietic nutrients 3) hemolysis.[11]

The common causes of Anemia are nutritional, bleeding peptic ulcer, Hemorrhoids, and Menorrhagia, and DUB in Females Megaloblastic anemia is seen in pregnant women and Males above 50 years. In Megalobasltic anemia due to Vit B_{12} Deficiency, the majority of patients are vegetarians. In Females the causes multifactorial like pregnancy, menorrhagia, and carci-

noma calcium, social and economic.

A study conducted by Govt. of India in 1978 shows that Nutrition and pregnancy are more common causes of Anemia in women.[12] In Males, the more common causes are Bleeding peptic ulcer, and Hemorrhoids causes of Anemia in the elderly are broadly classified into 3 types (1) Nutritional (2) Anemia of chronic disease, and (3) unexplained Anemia.

Drugs also can cause Anemia the Mechanism is unknown & may be suppression of erythropoiesis and other co-morbid conditions leads to Anemia due to drugs. Vitamin B12 absorption may be decreased by oral Hypoglyucemic drugs like Metformin and antiepileptics like phenytoin.

According to a study conducted by Douglass et al the causes of Anemia in old age, people are (1)Anemia of chronic disease 35-42% iron deficiency Anemai 18-22% and Megaloblastic anemia is 7-9%. Iron cannot be absorbed from the Jejunum and duodenum in chronic blood loss. The surge of RBC is decreased to give rise to the Microcytic and Hypochronmic type of anemia. In megaloblastic Anemia, RBCS are increased in size distorted in shape, with low fragility membrane which ruptures easily. In Hemolytic Anemia, The RBCs may have normal size but life span in short. In hereditary spherocytosis the RBCs are small in size and spherical in shape, the biconcave disease is not seen. The abnormal hemoglobin S is present in sickle cell Anemia 0.5 to 1.0% of west African are having hemolytic Anemia.

Upper Gastrointestinal lesions are more common than lower gastrointestinal lesions, peptic ulcer disease alcoholic gastritis, and drug-induced gastritis due to NSAIDS, which are very common, According to a study conducted by Lucas CA; Logan EC shows similar results.[13] In a study conducted by Dougless et al, the most common cause of Anemia in the elderly was anemia of chronic disease (30 - 40%), iron deficiency anemia is 15 - 20% Vit B_{12} deficiency is 5 - 10%. Red cells that are much smaller than normal and have too little hemoglobin inside them are then produced giving rise to Microcytic, Hypochromic anemia.[14] In Megaloblastic Anemia, erythroblasts cannot proliferate rapidly enough to form a normal number of Red cells, those Red cells that are formed are mostly increases in size and different shapes, and have fragile membranes, these cells rupture easily, leaving the person in dire need of an adequate number of red cells. In Hemolytic anemia, the number of Red cells formed may be normal but the life span of fragile red cells is short. In hereditary spherocytosis, the red cells are very small and spherical rather than biconcave discs. In sickle cell anemia, which is present in 0.3 to 1.0% of West African and American blocks, the cells have an abnormal type of hemoglobin called hemoglobin S; containing faulty beta chain is the hemoglobin molecule. The presence of Fever is significant in Anemia; infection may be the common cause. The Natural defense mechanism by which neutrophils

and macrophages will be decreased. Normally the bacteria will be killed and ingested by neutrophils and Macrophages. The important cause of cytopenia is Megaloblastic Anemia Thrombocytopenia usually develops when the severity of Anemia increases.[15] In megaloblastic Anemia, erythroblasts cannot proliferate rapidly and RBC which are formed are increased in size and with a distorted shape with low Fragility of Membrane. In hemolytic Anemia the number of RBCs is normal but the life span will be decreased. The most important index in serum iron concentration less than 0.50 mg/ indicates iron Deficiency. The single most investigation is serum ferritin levels. Iron stores in the body are reflected by serum ferritin levels less than 10 micro indicates the absence of iron stores. Serum transferrin saturation should be above 16%.[16] Iron absorption is increased by vitamin C, fructose, and ethanol. Vitamin B12 is found in foods of animal origin. This means strict vegetarians are at risk of developing Vitamin B 12 deficiency.[17] Megaloblastic anemia is an important cause of cytopenia, but to the best of our knowledge, there are not many studies quoting its incidence. It is generally believed that as the severity of anemia increases, thrombocytopenia develops followed by.[18] In Megaloblastic Anemia, erythroblasts cannot proliferate rapidly enough to form a normal number of Red cells, those Red cells that are formed are mostly oversized, have bizarre shapes, and have fragile membranes, these cells rupture easily, leaving the persons in dire need of an adequate number of red cells, In Hemolytic anemia, the number of Red cells formed may be normal but the life span of fragile red cells are short. In hereditary spherocytosis, the red cells are very small and spherical rather than Bi concave dishes. In sickle cell anemia, which is present in 0.3 to 1,0% of West African and American blocks, the cells l have an abnormal type of hemoglobin called hemoglobin S, containing faulty beta chain in the hemoglobin molecule.[19] In megaloblastic anemia, peripheral smear shows macrocytosis, anisopoikilo cytosis in 97% cases and hyper segmental neutrophils shows 88%. Prabha et al. found similar results in their study. The studies conducted by Subrahmanyam shows 57.35% of hyper segmented neutrophil in megaloblastic anemia. Vitamin B_{12} is found only in foods of animal origin although it is synthesized exclusively by microorganisms there is being no plant source of this vitamin. This means the strict negations are at risk of developing vitamin B_{12} deficiency.[20] Vitamin B_{12} is absorbed bound to intrinsic factor, a small glycoprotein secreted by parietal cells of the gastric mucosa. Gastric acid and pepsin release the vitamin from protein binding in food and make it available to bind to cobalophinlin. Previous anemia arises when vitamin B_{12} deficiency blocks the metabolism of folic acid leading to functional folate deficiency. The common causes are Iron deficiency and vitamin B_{12} and folic acid deficiency. The prevalence of anemia in pregnancy is very high 45% to 67% in developing countries.[21] Studies show that educated women are less likely to have anemia than uneducated educated pregnant women who have better income and nutritious food better medical facilities. A study conducted in Ethiopia also shows that anemia is more common in educated pregnant women.[21]

Conclusion

The causes of anemia are diverse. The most common cause is nutritional and iron deficiency follows by megaloblastic anemia. These can be prevented by periodical health checkups and Investigations'. So health agencies Govt. and NGOs have to focus on this issue especially in rural areas. In elderly people chronic renal failure and homological and GI Malign ayes are common. In India still, the common cause of anemia is nutrition and pregnancy is the next common cause.

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