

An Analytical Study on Prevalence, Etiology and Clinical Features of Iron Deficiency Anaemia

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ABSTRACT

Background: Anaemia means decreased oxygen carrying capacity of blood, which is associated with decreased haemoglobin levels. Normal values of haemoglobin in Indian adults are 14 to 16 grms percent in males and 12 to 14 grms percent in females. Iron deficiency anaemia is very common in developing countries like India, Africa, Bangladesh. Single most sensitive tool for evaluating the iron status is by measurement of serum ferritin. In India, Iron deficiency anaemia is more prevalent in children and pregnant women, especially in rural areas.

Aim of the Study: This study is conducted to know the prevalence and pattern of Iron deficiency Anaemia in a teaching hospital.

Materials and Methods: This study has been conducted in Geetanjali Medical College & Hospital, for 9 months from, February 2021 to October 2021, in the department of General Medicine. We have included 250 patients in this study.

Results: We have included 250 patients in the study, out of those 250 patients 105 were Male patients and 145 were Female patients. The age group involved is between 20 years and 70 years.

Conclusion: Iron Deficiency Anaemia is very common in developing countries. In India, Iron deficiency anaemia is mostly due to under nutrition and pregnancy, Hookworm infestation is also very common in rural areas. With Iron Supplementation, the complications of anaemia can be easily prevented.


Keywords: Haemoglobin, Anaemia, Iron Deficiency, Ferritin, GI bleeding, Hookworm.

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INTRODUCTION

The World Health Organization (WHO) defines anaemia as a haemoglobin levels less than 13 grms/dl in men and less than 12 grms/dl in women. Haematopoiesis is the process by which the formed elements of blood are produced. The process is regulated through a series of steps beginning with the haematopoietic stem cells. Stem cells are capable of producing red cells, all classes of gametocytes, monocytes, platelets, and the cells of the immune system.¹

In the bone marrow, the first Morphologically recognised erythroid precursor is the pronormoblast. The organ responsible for red cell production is called the erythron. Normal red cell production results in the daily replacement of 0.8 – 1% of all circulating red cells in the body, since average red cell lives 100 to 120 days. The size of red cell mass reflects the balance of red cell production and destruction. The physiologic basics of red cell production and destruction provides an understanding of the mechanisms that can lead to Anaemia. The critical elements of erythropoiesis EPO production, Iron availability the proliferative capacity of the bone

marrow and effective maturation of red cell precursors are used for the initial classification of anaemia.²

The Adult human body contains between 3 – 4 grams of iron of which about 60 to 70% is present in the blood (haeme iron) as circulating iron and the rest (1 to 1.5 gr) as storage iron. Each gram of haemoglobin contains about 3.34 mg of Iron. Iron is mostly absorbed from duodenum and upper small intestine in the ferrous state, according to the body needs. The absorbed Iron is transported as plasma ferritin and stored in liver, spleen, bone marrow and kidney. The total daily iron loss of an adult is probably 1mg and about 12.5 mgs per 28 days cycle in menstruating women. Evaluating of Iron status is based on Haemoglobin Concentration, Serum iron concentration, Serum ferritin, Serum transferrin saturation.³

In India 72.2% of children up to the age of 3 years in urban areas and 81.2% in rural areas are anaemic. In almost all states 50% of pregnant women are having anaemia. Overall prevalence has increased from 74.2% (1998 – 99) (98 – 99) to 79.2% (2005 –

2006). Bihar has the highest prevalence 87.6% followed by Rajasthan (85.1%).⁴

As per district level health survey (2002 – 04) prevalence of anaemia in adolescents' girls is very high. (72.6%). The iron deficiency can rise either due to inadequate intake or poor bioavailability. The poor bioavailability is considered to be a major reason for widespread iron deficiency.

According to a study by WHO on anaemia during 1993-2005, worldwide prevalence of anaemia was 25%. According to WHO guidelines for control of IDA, nutritional anaemia is a major public health problem in India and is primarily due to iron deficiency. The National Family Health Survey-3 (NFHS-3) data suggests that the prevalence of anaemia in adolescent girls (15-19 years) is 56%. According to National Nutrition Monitoring Bureau Survey (NNMBS) 2006, the prevalence of anaemia in adolescent girls (12-14 years) is 68.6% whereas in (15-17 years) it is 69.7%. Iron deficiency is a preventable cause. High prevalence of anaemia (Haemoglobin <12 gm%) among adolescent girls in India, causes 1.8% loss of GDP. Daily requirement of iron for adolescent girl is 0.8 mg/1000 Kcal of dietary energy. In 12th five-year plan Indian government has set a goal to reduce the load of anaemia in girls and women by 50%. This study will help to make strategy to combat it by cost effective method like iron supplementation and food fortification for adolescent girl and will help to reduce the morbidity and mortality and increase the work productivity.

Causes of Iron Deficiency Anaemia are Malnutrition, Infections such as Malaria, hook worm infestation, gastrointestinal bleeding and pregnancy. Clinical features are Fatigue, Loss of Concentration, Pallor, Shortness of Breath, Pedal edema, tachycardia and signs of malnutrition like angular stomatitis, cheilosis and flat nails, chylonychia (spoon shaped nails).

MATERIALS AND METHODS

This study has been conducted for 9 months from Feb 2021 to October 2021. We have included 250 patients in this study. Out of these 250 patients 105 male patients and 145 female patients. The age group involved is between 20 and 70 years. The common age group is in 2nd and 3rd decade. We have obtained the consent from all the patients by giving consent forms in their local language. After taking detailed history, we have examined all the patients in detail and advised investigations. The investigations advised are complete blood picture, peripheral smear examination, RBS, Serum ferritin, Blood urea, Serum creatinine, stool for ova and cyst and blood for malaria parasite and blood grouping and cross matching in some severe anaemia cases. The entire data is collected systematically and computerised by using MS Office.

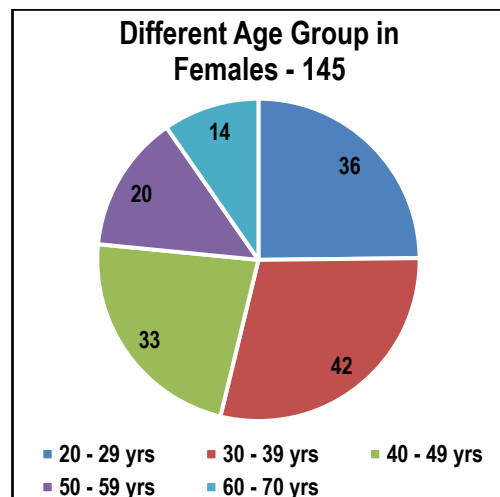
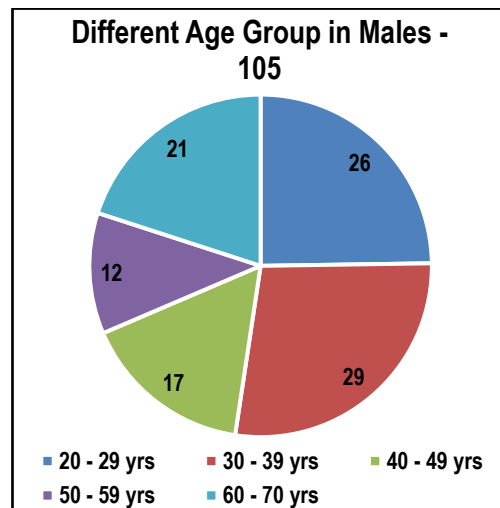
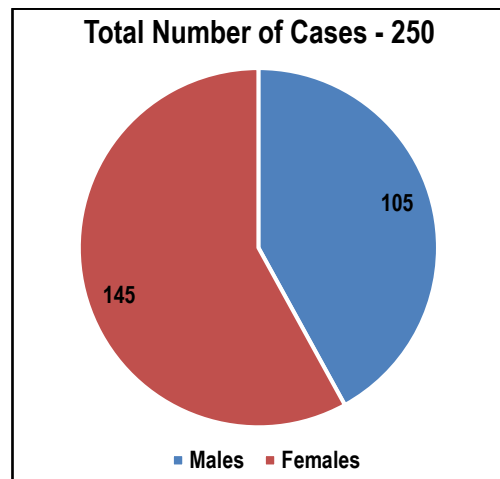


Table 1: Different Age Groups

S.No	Age In Years	No. of Patients Males (105)	No. of Patients Females (145)
1	20 – 29	26(27.3%)	36(52.2%)
2	30 – 39	29(30.45%)	42(60.9%)
3	40 – 49	17(17.85%)	33(47.85%)
4	50 – 59	12(12.6%)	20(29%)
5	60 - 70	21(22.05%)	14(20.3%)

Table 2: Clinical Features

S.No	Clinical Features	No. of Patients Males (105)	No. of Patients Females (145)
1	Pallor	105(100%)	145(100%)
2	Fatigue	90(85.71%)	125(86.3%)
3	Shortness Of Breath	62(59.15%)	87(60.5%)
4	Tachycardia And Others	71(62.61%)	98(67.8%)

Table 3: Causes of Iron Deficiency Anaemia

S.No	Causes	No. of Patients Males (105)	No. of Patients Females (145)
1	Malnutrition	31(29.5%)	49(57.79%)
2	Pregnancy	NA	28(19.31%)
3	Gastrointestinal Bleeding	57(54.8%)	34(23.44%)
4	Others	10(9.52%)	23(17.5%)

Table 4: Different Living Areas

S.No	Living Area	No. of Patients Males (105)	No. of Patients Females (145)
1	Agency Area	58(55.23%)	89(61.37%)
2	Rural Area	31(29.52%)	40(27.58%)
3	Semi Urban Area	10(9.52%)	11(7.5%)
4	Urban Area	06(5.71%)	05(3.5%)

Table 5: Grading of Anemia

S.No	Degree of Anemia	No. of Patients Males (105)	No. of Patients Females (145)
1	Mild Anemia Hb% levels (10 – 11.9 grms%)	62(65.1%)	81(117.45%)
2	Moderate Anemia Hb% levels (8 – 9.9 grms%)	30(31.5%)	32(46.4%)
3	Severe Anemia Hb% levels (< 8 grms%)	13(13.65%)	18(26.1%)

RESULTS AND DISCUSSION

We have included 250 patients in this study out of these 250, male patients were 105 and female patients were 145. The common age group is 2nd and 3rd decade. The studies conducted by Kaur et al shows the common age group is around 2nd decade especially in females.⁵

The common clinical features in our study are Pallor (100%) fatigue 85.7% males and 86.3% in females: shortness of breath, 59.5% in males and 61.2% in females. And tachycardia and others 62.5% in males and 67.9% in females. The results shown by Chaudary et al, are Pallor in 100%, fatigue in 81.3%, shortness of breath in 51.6%.⁶ In our study mild degree of anemia (haemoglobin levels are between 10-11.9 gr%) is seen in 63% of males and 76% in females. Moderate degree of anemia (haemoglobin levels are between 8.0gr% -10.0 gr%) is seen in 31% of males and 13.5% of females and severe degree of anemia (haemoglobin levels less than 8.0 gr%) seen in 8.9% of males and 14.2% of females. The studies conducted by Gupta et al shows 59.9%; 32.6% and 11.3% respectively in males and 71.5%; 14.2%; 16.5% in females respectively.⁷ In India anemia mostly seen in rural area, more than 75% cases are in agency and rural area only, In our study nearly 81% of cases are in agency and

rural area. The studies shown by Mohapatra et al shows nearly similar results.⁸

Anaemia is a global health problem. The prevalence is more in developing countries like India, Bangladesh, Ethiopia, Zimbabwe. It is very common in children, adolescent girls and pregnant women, and is due to increased iron demand, menstrual blood loss, infections and hookworm infestation.⁹ Iron has a major role in human body. Iron is needed for various functions, oxygen transport, DNA synthesis. WHO estimates nearly two billion people suffering from anaemia and approximately 50% of those cases are due to Iron deficiency? The requirement of iron in fact doubles during adolescence as compared to younger age. There is a significant increase in the requirement of iron from preadolescent level of approximately 0.7 – 0.9 mg iron per day as much as 1.37 – 1.88 mg per day in adolescent boys and 1.40 – 3.27 in adolescent girls. In India the prevalence of anaemia in adolescent girls is nearly 56% and in adolescent boys is nearly 32.5%.¹⁰

Synthesis of haemoglobin begins in the proerythroblast and continues even into the reticulocyte stage of red blood cells. Iron is not only important for formation of haemoglobin but also of other

elements in the body (myoglobin, cytochromes, cytochrome oxidase. The total quantity of iron in the body averages 4 – 5 gm, about 65% in the form of haemoglobin, 4% in the form of myoglobin, and 15 – 30% stored in reticuloendothelial system and liver.¹¹

Iron is absorbed from small intestine and transported in the form of transferrin. In the cell cytoplasm, the ferritin is formed, when iron combines with a protein, apoferritin. The progression of iron deficiency anaemia can be divided into 3 stages like Negative iron balance, Iron deficient erythropoiesis, Iron deficiency anaemia. In our study the common causes are malnutrition, gastrointestinal bleeding in the form of melaena, haemorrhoids and infections, hookworm infestation. Pregnancy is most common cause in young females. Menstrual blood loss is in 3rd and 4th decade. The common clinical features includes fatigue, lack of concentration, hair loss, shortness of breath, pedal oedema, pallor, tachycardia, angular stomatitis, koilonychia (spoon shaped nails). Laboratory studies includes decreased in haemoglobin levels, hypochromic, microcytic blood picture and most important is decreased serum ferritin levels. In our studies mild anaemia was noticed in nearly 60% of males and 49% of females (haemoglobin levels were 10 – 11.9 gr%); Moderate anaemia was seen in 22% of males and 27% of females (haemoglobin levels 8 – 9.9 gr%) and severe anaemia was noticed in 8% of males and 13% of females (haemoglobin levels are < 8 gm). The studies conducted by Vasanth et al shows that Mild anaemia was seen in 52% of males and 41% of females; Moderate anaemia was seen in 31% of males and 36% of females; Severe anaemia was seen in 17% of males and 26% of females.¹²

In India, the prevalence of anaemia in adolescent girls is 56% (64 million girls).¹⁶ Prevalence of anaemia varies in different parts of the world, different states of a country and even in different districts of a state. Adolescent girls are more vulnerable to iron deficiency and anaemia due to increased requirement of iron which in turn is caused by abrupt increase in lean body mass and total blood volume, and menstrual blood loss.

Government of India has made many policies to combat this problem. WHO and UNICEF also started different programs to reduce anaemia in this particular group because if untreated these can affect next generation child resulting in increased morbidity and mortality and decreased productivity.

According to district level household survey on reproductive and child health in India, during 2002-2004, 99% of adolescent girls have any anaemia and 19% of them are mildly anaemic, 53% are moderately anaemic and 28% have severe anaemia. In a study done by Twara T et al., in Motihari town of Bihar, the prevalence of anaemia in adolescent girls was found to be 66%.¹⁰ In another study done in Rohtas district of Bihar, the prevalence was 43.2%. Many studies have been done to find out the prevalence of anaemia in adolescent girls in different parts of India and abroad and data of few studies has been given in. Study done in Vadodara, Nagpur (Urban area), Tamil Nadu and Lucknow found the prevalence of anaemia in adolescent girls to be 75%, 35.1%, 44.8% and 56% respectively. In other studies, done in North Pargana, Belgaum, rural Wardha, Hassan and Nepal prevalence was found to be 45%, 41.1%, 59.8%, 45.2% and 51.3% respectively.

CONCLUSION

Iron deficiency anaemia is a global health problem common in India. Especially in agency, rural areas and more prevalent in lower middleclass people. In India the prevalence is high among children, adolescent girls and pregnant women. The common causes are Malnutrition, Infections and Hookworm infestation with oral iron supplementation, Iron deficiency anaemia can be treated easily and complications can be easily prevented.

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