Original Research Article

A study of profile of patients with different degrees of anemia

Azad K. L.[1], Dwivedi S. K.[2]*

[1]Department of Pathology, Lt. BRKM Government Medical College, Jagdalpur, Chhattisgarh, India
[2]Department of Physiology, Lt. BRKM Government Medical College, Jagdalpur, Chhattisgarh, India

*Correspondence:
Dr. Dwivedi S. K.,
E-mail: drskd05@yahoo.com

ABSTRACT

Background: It has been estimated that 1.62 billion population of the world are suffering from anemia. Preschool children show a highest prevalence of 47.4%. Adult males show a lowest prevalence of 12.7% of anemia. Objective was to study the profile of patients with different degrees of anemia.
Methods: Over a period of seven months, from January 2014 to July 2014, a cross sectional study was conducted at department of pathology, Lt. BRKM government medical college, Jagdalpur, Chhattisgarh, India. It was possible to study the 250 cases during the tenure of the study period for the present study.
Results: It was found that only 3.2% of cases were not having anemia. Thus, the overall prevalence of anemia in the present study was found out to be 96.8%. 62.5% of males and 37.5% of females were having normal hemoglobin. It was found that with normal hemoglobin of more than 12 gm%, no case was having serum iron less than 10.6 µmol/l. All cases without anemia had normal serum iron. 30.3% of cases of anemia had normal serum iron levels. 75.6% of cases across all degrees of anemia were showing microcytosis. This was more in moderate anemia having hemoglobin of 6-9 gm% followed by 42.4% in cases having mild anemia of hemoglobin of 9-12 gm%. Only 13.5% with severe degree of anemia were showing the microcytosis. 24.4% of cases were showing the normocytosis whereas no case has shown the macrocytosis.
Conclusions: Prevalence of anemia was more in females. Serum iron did not correspond with the degree of anemia. There is need to emphasize more on awareness about anemia and its prevention especially in mother and child age group.

Keywords: Anemia, Prevalence, Profile

INTRODUCTION

When the mass of total circulating red cell is less than normal, that condition is known as anemia. As the hemoglobin concentration decreases, also the oxygen reaching to tissues reduces. This is because one of the essential functions of hemoglobin is to carry oxygen. Because of decreased supply of oxygen to the tissues, the tissues undergo hypoxia. For diagnosis of anemia, red cell mass should be measured. But, it is not very easy and practicable. Hence, we use haematocrit value for the diagnosis of anemia. Haematocrit is nothing but a ratio. It is obtained by dividing the packed cell volume to the total volume of the blood.

Most commonly used test is hemoglobin for diagnosis of anemia.[1] In anemia, the mass of erythrocyte gets diminished. This affects the overall oxygen carrying capacity. A reduction in the concentration of the hemoglobin is also seen.[2]

Due to anemia, there is decreased supply of oxygen to the tissues and the organs. Thus, blood could not meet the physiological needs of the body. This condition can arise

either due to increased destruction of the red blood cells or due to decreased production of the red blood cells.[3]

Anemia is found to be associated with a lot of morbidity and mortality. It also affects the overall performance of the person. It leads to mortality during perinatal period. There is increased mortality and morbidity among children due to anemia. Chronic anemia can lead to improper mental development among children. Immunity is also affected. People become more exposed to risk and effects of lead poisoning.[4]

Thus, anemia is a public health problem of immense importance. It is not only affecting the people in the developing countries but it is also affecting the people in the developed countries. It is seen commonly at all age groups and among both the sexes. It has a high impact bearing especially among antenatal, postnatal mothers and among the children.[5]

It has been estimated that 1.62 billion population of the world are suffering from anemia. This leads to a prevalence of 24.8% of anemia globally. Preschool children show a highest prevalence of 47.4%. Adult males show a lowest prevalence of 12.7% of anemia. World Health Organization (WHO) estimates point that Africa is the worst affect region due to anemia. The prevalence of anemia in Africa ranges from 47.5% to 67.6%. In Africa region, the most commonly affected group are women of child bearing age, pregnant women and the preschool children. As per WHO estimates, almost 315 million people in South East Asia region are having anemia.[6]

Considering the high prevalence of anemia all over the world and especially high burden that it carries in developing countries like India, and given the fact that anemia is responsible for a wide variety of morbidity and mortality in all age groups, but knowing that it especially affects the mother and children, present study was carried out with the objective to study the profile of patients with various degrees of anemia.

METHODS

Study design and place of study: hospital based cross sectional study was carried out at department of pathology, Lt. BRKM government medical college, Jagdalpur, Chhattisgarh, India.

For the present study, institutional ethics committee of Lt. BRKM government medical college permission was obtained before the start of the study after submitting the required protocol of the present study and doing all necessary procedure. Informed consent was taken from all the patients. Study period: January 2014 to July 2014. Sample size: during the study period, it was possible to study 250 cases.

Inclusion criteria

- Willing to participate in the study
- Apparently healthy and free from any diseases.

Exclusion criteria

- Not willing to participate in the study
- Having any severe systemic disease.

Over a period of seven months, from January 2014 to July 2014, a cross sectional study was conducted at department of pathology, Lt. BRKM government medical college, Jagdalpur, Chhattisgarh, India. It was possible to study the 250 cases during the tenure of the study period for the present study.

Data was recorded in a pre-designed, pre-tested semi structured questionnaire for the present study. The details like name, age, sex, address, education, occupation, total family members, total family income, per capita income, social class, any presenting complaints etc, were recorded in the abovementioned questionnaire for the present study.

Necessary investigations like hemoglobin, serum iron and mean corpuscular volume (MCV) were carried out as per standard guidelines and standard protocol for the present study.

Statistical analysis

Data was entered in the Microsoft Excel Worksheet and analyzed using proportions. Chi square test was used wherever appropriate. P value of less than 0.05 was taken as statistically significant.

RESULTS

Table 1 shows age and sex wise distribution of the cases. Maximum number of cases were in the age group of 15-24 years (20.8%) followed by 35-44 years of age (19.2%). This was followed by 0-14 years constituting 16% of cases and 15.2% of cases in the age group of 25-34 years. Elderly above the age of 55 years were less in number. Males and females in the present study were almost equal in number.

Table 2 shows degree of anemia according to age. It was found that only 3.2% of cases were not having anemia. Thus, the overall prevalence of anemia in the present study was found out to be 96.8%. Prevalence of severe anemia was 22%, that of moderate anemia was 32.8% and that of mild anemia was 42%. Prevalence of severe anemia was highest in the age group of 35-44 years. Prevalence of moderate anemia was highest in the age group of 15-24 years. Prevalence of mild anemia was highest in the age group of 35-44 years.

Table 1: Age and sex wise distribution of the cases.

Age (years)	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
0-14	27	22.13	13	10.15	40	16
15-24	17	13.93	35	27.34	52	20.8
25-34	13	10.15	25	19.53	38	15.2
35-44	21	17.21	27	21	48	19.2
45-54	22	18.03	07	5.11	29	11.6
55-65	09	7.37	13	10.55	22	8.8
> 65	13	10.65	08	6.25	21	8.4
Total	122	100	128	100	250	100

Table 2: Degree of anemia according to age.

Age (years)	Hemoglobin (gm %)								Total	
	< 6		6-9		9-12		> 12			
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
0-14	12	21.8	17	20.7	09	8.6	02	25	40	16
15-24	12	21.8	18	21.9	20	19.1	02	25	52	20.8
25-34	05	9.1	11	13.4	21	20	01	12.5	38	15.2
35-44	14	25.5	11	13.4	22	20.9	01	12.5	48	19.2
45-54	02	3.6	12	14.6	15	14.3	00	00	29	11.6
55-65	08	14.5	09	10.9	05	4.8	00	00	22	8.8
> 65	02	3.6	04	4.9	13	12.4	02	25	21	8.4
Total	55	22	82	32.8	105	42	08	3.2	250	100

Table 3: Degree of anemia according to sex.

Sex	Hemoglobin (gm %)								Total	
	< 6		6-9		9-12		> 12			
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Male	25	45.5	47	57.3	45	42.9	05	62.5	122	48.8
Female	30	54.5	35	42.7	60	57.1	03	37.5	128	51.2
Total	55	22	82	32.8	105	42	08	3.2	250	100

Table 3 shows degree of anemia according to sex. It was found that prevalence of severe anemia was more among females as compared to males (54.5% vs. 45.5%). Similar observation was seen for mild anemia also, i.e. more prevalence among females than males. But moderate degree of anemia was more among males as compared to females. 62.5% of males and 37.5% of females were having normal hemoglobin.

Table 4: Correlation of serum iron with degree of anemia in nutritional anemia.

Hemoglobin (gm %)	Serum iron (µmol/l)			Number of cases
	< 10.6	10.6-28.3	> 28.3	
< 6	15 (62.5%)	09 (37.5%)	00	24
6-9	32 (66.6%)	15 (31.3%)	01 (2.1%)	48
9-12	31 (67.4%)	09 (19%)	06 (12.6%)	46
> 12	00	04 (100%)	00	04
Total	78 (63.9%)	37 (30.3%)	07 (5.8%)	122

In the present study, serum iron was carried out only in 122 out of 250 cases. Table 4 shows correlation of serum iron with degree of anemia in nutritional anemia. It was found that with normal hemoglobin of more than 12 gm%, no case was having serum iron less than 10.6

µmol/l. All cases without anemia had normal serum iron.

30.3% of cases of anemia had normal serum iron levels.

Table 5: Comparison of variation of MCV and degree of anemia in case of IDA (serum iron < 10.6 gm %).

Hemoglobin (gm %)	MCV (fl)			Number of cases
	< 76	76-96	> 96	
< 6	08 (13.5%)	07 (36.8%)	00	15
6-9	26 (44.1%)	06 (31.6%)	00	32
9-12	25 (42.4%)	05 (26.3%)	00	30
> 12	00	01 (5.3%)	00	01
Total	59 (75.6%)	19 (24.4%)	00	78

While comparing MCV for different degrees of anemia in cases of IDA it was found from above table that 75.6% of cases across all degrees of anemia were showing microcytosis. This was more in moderate anemia having hemoglobin of 6-9 gm% followed by 42.4% in cases having mild anemia of hemoglobin of 9-12 gm%. Only 13.5% with severe degree of anemia were showing the microcytosis. 24.4% of cases were showing the normocytosis whereas no case has shown the macrocytosis.

DISCUSSION

Maximum number of cases were in the age group of 15-24 years (20.8%) followed by 35-44 years of age (19.2%). It was found that only 3.2% of cases were not having anemia. Prevalence of severe anemia was 22%, that of moderate anemia was 32.8% and that of mild anemia was 42%. It was found that prevalence of severe anemia was more among females as compared to males (54.5% vs. 45.5%). Similar observation was seen for mild anemia also, i.e. more prevalence among females than males. It was found that with normal hemoglobin of more than 12 gm%, no case was having serum iron less than 10.6 µmol/l. All cases without anemia had normal serum iron. 30.3% of cases of anemia had normal serum iron levels. While comparing MCV for different degrees of anemia in cases of IDA it was found in 75.6% of cases across all degrees of anemia were showing microcytosis. This was more in moderate anemia having hemoglobin of 6-9 gm% followed by 42.4% in cases having mild anemia of hemoglobin of 9-12 gm%. Only 13.5% with severe degree of anemia were showing the microcytosis. 24.4% of cases were showing the normocytosis whereas no case has shown the macrocytosis.

Sgnaolin V et al in their study found a 12.8% of prevalence of anemia.[7] It was more in females (13.7%) when compared to males (10.4%). They also found that the most common type of anemia in their study was normocytic normochromic anemia without anisocytosis in 46% of cases. The prevalence of microcytosis was 12% among anemic cases as compared to only 1.5% among non-anemic persons. The prevalence of hypochromia was 40% among anemic cases as compared to only 8.8% among non-anemic persons. The prevalence of anisocytosis was 26% among anemic cases as compared to only 7% among non-anemic persons.

Gaiha M et al carried out a prevalence study of IDA among 33 patients of cyanotic congenital heart disease (CCHD).[8] They also tried to study the relation between hyper viscosity and cyanotic congenital heart disease (CCHD). This was therapeutic study as they treated the cases with low dose iron i.e. 60 mg of elemental iron daily single dose and observed the effect of this treatment on the viscosity of the blood in terms of relief from its symptoms. They also carried out all necessary detailed hematological investigations. They found and reported a prevalence of 18.2% of IDA. They also noted that 30.3% of the cases were presenting with symptoms of hyper viscosity. The levels of packed cell volume were found to be lesser in IDA patients as compared to normal patients. With the treatment with low dose elemental iron of 60 mg per day, the author reported that there was an increase of mean iron levels of 2.1 gm/dl.

Kouli R et al in their study done to study the prevalence of anemia, found and observed that 71.58% of people were having anemia.[9] They also studied the degree of anemia like the present study and reported almost similar findings. Like present study, they also noted that moderate degree of anemia was more than mild degree of anemia. The authors also showed that the most common type in anemia was microcytic hypochromic. The anemia was more common in the reproductive age group, which is like the findings of the present study.

Patel S et al in their study found that 40 persons had iron deficiency anemia.[10] They reported that the prevalence was more in females than males; this finding is like the finding of the present study. They found that 21-30 years of age group was the mostly affected group by anemia, this finding is also like the finding of the present study. They reported a prevalence of 53% of anemia based on the study of concentration of serum ferritin. They also found that anemia was more prevalent among patients taking vegetarian diet in 84% as compared to persons

taking non-vegetarian diet more frequently. They observed that labourer's occupation was the most commonly affected occupation due to anemia. The authors also carried out peripheral smear examination for the patients. On this basis, they reported that 72% of the patients were showing hypochromic microcytic anemia.

CONCLUSION

Prevalence of anemia was more in females. Prevalence of severe anemia was 22%, that of moderate anemia was 32.8% and that of mild anemia was 42%. All cases without anemia had normal serum iron. 30.3% of cases of anemia had normal serum iron levels. Serum iron did not correspond with the degree of anemia. There is need to emphasize more on awareness about anemia and its prevention especially in mother and child age group.

REFERENCES

1. Qureshi NA, Chauhan MA, Goswami AP, Suri SK. Study of anemia and its correlation with hematological parameters in patient of various age group. IOSR J Dental Med Sci. 2015;14(9):29-35.
2. Hoffbrand AV, Moss PAH, Pettit JE. Erythropoiesis and general aspects of anaemia. Essential Haematology. Fifth ed. UK: Blackwell Publishing; 2006:18-20.
3. Ciesla B. Red blood cell production, function, and relevant red cell morphology. Haematology in practice. Philadelphia: F. A. Davis Company; 2007:37-46.
4. Dallman PR. Iron. In: Brown M, editor. Present knowledge in nutrition. Washington: Nutrition Foundation; 1990:241-250.
5. World Health Organization. The world health report: reducing risks, promoting healthy life. Geneva: World Health Organization; 2002. Available at http://www.who.int/whr/2002/en/.
6. World Health Organization. Worldwide prevalence of anaemia 1993-2005. WHO Global Database on Anaemia. Geneva: WHO Press; 2008:7-8. Available at: http://apps.who.int/iris/bitstream/ 10665/43894/1/9789241596657_eng.pdf.
7. Sgnaolin V, Engroff P, Ely LS, Schneider RH, Schwanke CH, Gomes I, et al. Hematological parameters and prevalence of anemia among free-living elderly in south Brazil. Rev Bras Hematol Hemoter. 2013;35(2):115-8.
8. Gaiha M, Sethi HP, Sudha R, Arora R, Acharya NR, et al. A clinico-hematological study of iron deficiency anemia and its correlation with hyper viscosity symptoms in cyanotic congenital heart disease. Indian Heart J, 1993;45(1):53-5.
9. Kouli R, Pegu AK, Teronpi J, Shukla R, Bhattarcharjee S, Sonowal S, et al. Study of anaemia in correlation with hematological parameters among adults in a tertiary care centre of North-East India. Int J Med Res Prof. 2016;2(4):84-7.
10. Patel S, Shah M, Patel J, Kumar N. Iron Deficiency anemia in moderate to severely anemic patients, Gujarat Med J. 2009;64(2):15-8.