

Clinical profile of patients aged 15 years and above presenting with haemoglobin level of less than 7gm%

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Abstract

Background: Anemia is a major health problem in India¹. According to the World Health Organization (WHO), there are two billion people with anaemia in the world and half of the anaemia is due to iron deficiency¹. A study done by Dr S V Subramanian showed that anaemia was disproportionately concentrated in low socio-economic groups, and that maternal anaemia was strongly associated with child anemia⁴. **Aims and Objectives:** 1) To study the clinical profile of patients aged 15 years and above presenting with haemoglobin level of less than 7gm %. 2) To study the etiological profile of anemia in both sexes aged above 15 years. 3) To study the etiology of very severe anemia with haemoglobin level of less than 4 gm %. **Materials and Methods:** It is a prospective Observational study done in KAMINENI ACADEMY OF MEDICAL SCIENCES AND RESEARCH CENTRE. Data were collected from patients admitted in department of General Medicine. Patients of both sexes who are aged >15 yrs were included in the study. Data is collected by using history, physical examination, and laboratory parameters. **Results:** Out of 100 cases 41% were males and 59% were females. Predominant age group was 20-29 years, with nutritional deficiencies being most common cause. Nutritional anemia was most common cause of anemia amongst all age groups. While second most common was chronic malaria in all age groups except 15-20 years where aplastic anemia was the second most common cause. Nutritional anemia was common cause for very severe anemia (HB <4gm/dl), followed by drug induced bone marrow suppression and hook worm infestation. **Conclusion:** nutritional anemia is most common cause of severe and very severe anemia, with chronic malaria being second most common cause. Stool examination, Peripheral smear along with staining for parasites must be performed in all cases of anemia during the workup.

Key Words: Anemia, Hemoglobin, clinical features, Nutritional anemia

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Received Date: 08/11/2019 Revised Date: 18/12/2019 Accepted Date: 21/01/2020

DOI: <https://doi.org/10.26611/10211415>

Access this article online

Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 04 April 2020

INTRODUCTION

Anemia is a major health problem in India.¹ According to the World Health Organization (WHO), there are two billion people with anaemia in the world and half of the

anaemia is due to iron deficiency¹. Most of the anemias are due to inadequate supply of nutrients like iron, folic acid and vitamin B12, proteins, amino acids, vitamins A, C, and other vitamins of B-complex group *i.e.*, niacin and pantothenic acid are also involved in the maintenance of hemoglobin level². In the 2005- 2006 National Family Health Survey (NFHS-3), a household survey aimed at having national and state representative data on population health and nutrition; the prevalence of anaemia was 70% in children aged 6–59 months, 55% in females aged 15–49 years, and 24% in males aged 15–49 years³. A study done by Dr S V Subramanian showed that anaemia was disproportionately concentrated in low socio-economic groups, and that maternal anaemia was strongly associated with child anemia⁴.

How to cite this article: Sai Krishna Tulasi, Suresh I, Ramakrishna Goud Peddi, M Swamy. Clinical profile of patients aged 15 years and above presenting with haemoglobin level of less than 7gm%. *MedPulse International Journal of Medicine*. April 2020; 14(1): 22-26.
<https://www.medpulse.in/Medicine/>

AIMS AND OBJECTIVES

1. To study the clinical profile of patients aged 15 years and above presenting with haemoglobin level of less than 7gm %.
2. To study the etiological profile of anemia in both sexes aged above 15 years.
3. To study the etiology of very severe anemia with haemoglobin level of less than 4 gm %.

MATERIALS AND METHODS

It is a prospective Observational study done in KAMINENI ACADEMY OF MEDICAL SCIENCES AND RESEARCH CENTRE. Data were collected from patients admitted in department of General Medicine. Patients of both sexes who are aged >15 yrs were included in the study. Data is collected by using history, physical examination, and laboratory parameters. CBP is done with MINDRAY BC-5300 Automated hematologic cell counter and lymphocytes and platelets in Neubaus chamber. Malaria is done with thick smear, thin smear and Biostandard HRP-II(Pf), pLDH(Pv) antigen rapid test. Serum iron was estimated using ferene method on spectrophotometry. Serum vitamin B12 and Folate were estimated using chemiluminescence immunoassay on immunoassay analyser. Serum electrophoresis was done by using capillary on automatic electrophoresis. Bone marrow iron stores were estimated by using Pearl stain on bone marrow biopsy slides. Stool for ova, cyst was done by wet mount method. Peripheral smear and Bone marrow aspiration biopsy was studied on slide with leishman stain.

OBSERVATION, RESULTS AND DATA ANALYSIS

100 patients of anaemia meeting the inclusion and exclusion criteria were included for data analysis in this prospective study.

Table 1: sex ratio

SEX	NUMBER
MALE	41
FEMALE	59
TOTAL	100

Out of 100 patients 59 were female and 41 were male. In females anaemia appears to be more common.

AGE DISTRIBUTION

The age of the patients in this study ranged from 15 years and above with a mean of 34 years. The distribution of the age of patients in various decades of life as follow.

Table 2a: showing age distribution

Age group	Number of cases	Female	Male
15-19	20	12	8
20-29	26	14	12
30-39	20	12	8
40-49	16	11	5
50 and above	18	10	8
Total Number of Patients	100	59	41

Among all age groups nutritional anemia was the most common cause of anemia, followed by malaria. Hodgkins lymphoma was seen only in 30-39 years group, Nonhodgkins lymphoma did not show any age preferences. Hook worm infestation was seen among 15-20 and 30-40 years age groups (Table-2b).

Table 2b: showing cause of anemia in individual age group

Age group	Number of cases		
15-19	20	Nutritional	5 (25%)
		Aplastic anemia	2 (10%)
		Chronic malaria	3 (15%)
		Hook worm infestation	4 (20%)
		Hereditary spherocytosis	2 (10%)
		Non Hodgkins lymphoma	2 (10%)
20-29	26	Tuberculosis	2 (10%)
		Nutritional	13(50%)
		Chronic malaria	6(23%)
		AML	1(3.8%)
		PNH	2(7.6%)
		Drug induced	2(7.6%)
30-39	20	Amoebic liver abscess	2(7.6%)
		Nutritional	10(50%)
		Chronic malaria	2 (10%)
		Hodgkins lymphoma	2(10%)
		Non Hodgkins lymphoma	2(10%)
		Hook worm infestation	2(10%)
40-49	16	Anemia due to blood loss	2(10%)
		Nutritional	7(43%)
		Chronic malaria	4(25%)
		Non Hodgkins lymphoma	2(12.5%)
		CML	2(12.5%)
		CA stomach	1(6.25%)
50 and above	18	Nutritional	8(44.4%)
		Chronic malaria	6(33.3%)
		Drug induced	2(11.1%)
		CA of GIT	2(11.1%)

CLINICAL FEATURES

The common symptoms with which patients presented in this study are

Table 3: common symptoms

Symptoms	Number of patients having
Fatigue	100
Tiredness	100
Giddiness	60
Dyspnea	42
Fever	42
Weight loss	32
Palpitations	28
Abdominal pain	24
Oedema	20
Bleeding diathesis	20
Paraesthesias	16
Chest pain	14
Jaundice	12
Diarrhea	6
Blood loss(Melena,Haematuria,Menorrhagia,Hematochezia)	6
Focal neurological deficit	2
Total Number of patients	100

All patients in this study had easy fatiguability and tiredness.60% of them have giddiness followed by shortness of breath on exertion in 42% of patients and fever in 42% of patients and weight loss in 32% of patients, palpitations in 28% of patients and pain abdomen in 24% of patients. Pedal edema in 20% of patients and bleeding diathesis in 20% of patients. Chest pain in 14% of patients and jaundice in 12% of patients.

CLINICAL SIGNS

Table 4:

Clinical sign	Number of patients
Hepatomegaly	42
Splenomegaly	38
Purpura/bleeding disorder	20
Koilonychia	18
Lymphadenopathy	16
Total Number of Patients	100

As shown above 42 patients had hepatomegaly of which 16 patients found to have Nutritional anemia,13 patients had malaria and 4 patients had NHL and one patient had Hodgkins lymphoma,CML in 2 patients and drug induced in 2 patients,AML in 2 patients,PNH and carcinoma colon in one each. Out of 38 patients with splenomegaly 14 had malaria and 10 had Nutritional anemia,4 had NHL,2 had CML,2 had Hereditary spherocytosis,2 had amoebic liver abscess,2 had drug induced bone marrow depression and 1 had anemia due to blood loss.

ETIOLOGY

Based on the clinical history, examination, morphological characteristics seen on peripheral smear and bone marrow and other relevant diagnostic modalities the following etiological categories were recognized in this study

Table 5:

Etiology	Number of cases
Nutritional	42
Leukemia's	3
Lymphomas	8
Chronic malaria	22
Hook worm infestations	6
Haemorrhoids	2
Hereditary spherocytosis	2
Secondary to Non hemopoietic malignancy	3
Drug induced	4
Aplastic anemia	2
Amoebic liver abscess	2
Paroxysmal nocturnal hemoglobinuria	2
Tuberculosis	2
Total patients	100

Out of 42 patients who presented with fever, commonest cause was malaria, followed by non hodgkins lymphoma, 4 cases were secondary to drugs ,only 2 were nutritional deficiency. Out of 43 patients with nutritional anemia 39 patients had megaloblastic anemia. Even in megaloblastic anemia 89% (n=35) had low bone marrow iron store levels. In nutritional anemia group peripheral smear of 10 showed microcytic hypochromic anemia, out of those 10 bone marrow studies revealed megaloblastic anemia in 60% (n=6). 21 Patients presented with malaria, all were falciparum malaria. Out of 21 who presented with malaria, peripheral smear showed microcytic hypochromic picture in 18 patients. 4 patient had drug induced anemia, all had pancytopenia, 2 had microcytic hypochromic RBCs, 2 had normocytic normochromic RBCs.

Table 6: Cause of anemia < 4 gm/dl

Nutritional anemia	11
malaria	2
Drug induced	4
Aplastic anemia	2
Hook worm infestation	4
Nonhodgkins lymphoma	2
AML	1
total	26

Hemoglobin less than 4 was seen in 26 patients and was most common in 20-29 age group,(table-6) Nutritional anemia was the common cause(26% of nutritional deficiency anemia), 100% of drug induced anemia were less than 4 gm/dl, suggesting drug induced anemia can be very severe. Hook worm infestation was also seen to cause hemoglobin less than 4 gm/dl (66% of anemia due

to hook worm infestation) (table-6). In Hook worm infestation peripheral smear was microcytic and hypochromic RBCs in all cases, 4 cases had eosinophilia. Bone marrow biopsy was done in 69 cases. 39 cases had megaloblastic anemia features, 4 had NHL, 12 had normoblastic marrow, Hyper cellular marrow in 4, hypoplastic marrow in 6, CML in 2, AML in 1(table-7).

Table 7: showing bone marrow picture

Disease	Number of patients
Megaloblastic anemia	39
Normoblastic marrow	12
Hypoplastic marrow	6
Hypercellular marrow	4
CML	2
AML	1

DISCUSSION

100 patients of anemia meeting the inclusion and exclusion criteria were included for data analysis in this prospective study. Out of 100 patients 59 were female and 41 were male. In females anemia appears to be more common. The age of the patients in this study ranged from 15 years and above with a mean of 34 years. 26% of patient were belonging to 20-29 years age, 20% each in 15-19 and 30-39 years age. A study done by K.S.Lamsal showed that in his study most common age group was between 40-49⁶. A study done by Chi hu hong lee in USA showed that in his study anemia was more common in males than in females between age group 80-89 years. Prevalance of anemia in males was increasing from 0.8% in age between 15-29 to 26.3% in age between 80-89. Iron deficiency was the most common cause of anemia⁷. A systematic analysis of global anemia burden from 1990 to 2010 by Nicholas J. Kassebaum showed that anemia was more prevalent in females than in males⁸. Among all age groups nutritional anemia was the most common cause of anemia, followed by malaria. Hodgkins lymphoma was seen only in 30-39 years group, Nonhodgkins lymphoma did not show any age preferences. Hook worm infestation was seen among 15-20 and 30-40 years age groups (Table-5).In K.S.Lamsal study Variceal bleeding leading to anemia was seen in 52, NSAID induced GI bleeding in 22, peptic ulcer in 18, hookworm infestation in 6, nutritional iron deficiency and anemia of chronic diseases in remaining cases⁶.The duration of illness was calculated from the onset of first symptom to the time of admission.The duration of illness ranged from 1month to 6 years.The range is wide due to varied etiological categories in the study. All patients in this study had easy fatiguability and tiredness.60% of them have giddiness followed by shortness of breath on exertion in 42% of patients and fever in 42% of patients and weight loss in 32% of patients, palpitations in 28% of

patients and pain abdomen in 24% of patients. Pedal edema in 20% of patients and bleeding diathesis in 20% of patients. Chest pain in 14% of patients and jaundice in 12% of patients. As shown above 42 patients had hepatomegaly of which 16 patients found to have Nutritional anemia,13 patients had malaria and 4 patients had NHL and one patient had Hodgkins lymphoma,CML in 2 patients and drug induced in 2 patients,AML in 2 patients,PNH and carcinoma colon in one each.

Out of 38 patients with splenomegaly 14 had malaria and 10 had Nutritional anemia,4 had NHL,2 had CML,2 had Hereditary spherocytosis,2 had amoebic liver abscess,2 had drug induced bone marrow depression and 1 had anemia due to blood loss. Based on the clinical history,examination,morphological characteristics seen on peripheral smear and bone marrow and other relevant diagnostic modalities the following etiological categories were recognized in this study Out of 42 patients who presented with fever, commonest cause was malaria, followed by non hodgkins lymphoma, 4 cases were secondary to drugs, only 2 were nutritional deficiency. Out of 43 patients with nutritional anemia 39 patients had megaloblastic anemia. Even in megaloblastic anemia 89% (n=35) had low bone marrow iron store levels. In nutritional anemia group peripheral smear of 10 showed microcytic hypochromic anemia, out of those 10 bone marrow studies revealed megaloblastic anemia in 60% (n=6). 21 Patients presented with malaria, all were falciparum malaria. Carmel R in his study showed that iron deficiency was coexistence in pernicious anemia. 20% of patients in his study had iron deficiency⁹. Out of 21 who presented with malaria, peripheral smear showed microcytic hypochromic picture in 18 patients. A study by Jamal showed that 40% of his patients with malaria had microcytic hypochromic RBCs¹⁰.4 patient had drug induced pancytopenia, 2 had microcytic hypochromic RBCs, 2 had normocytic normochromic RBCs. On the predictable lines about 60% of the patents with a hemoglobin of less than 3gm% had CHF. Only 4 patients with hemoglobin less than 3gm% did not had CHF and these 4 patients are very young(15-21year old).The incidence of CHF decreased as the severity of anemia decreased being about 16.6% in patients with a hemoglobin of 5.1-7gm%. A study by Branon *et al* showed that cardiac output increased when the Hb was less than 7 gm/dl¹¹. High output failure may supervene if the myocardial oxygen demand in severe anemia³. Hemoglobin less than 4 was seen in 26 patients and was most common in 20-29 age group,(table-6) Nutritional anemia was the common cause(26% of nutritional deficiency anemia), 100% of drug induced anemia were less than 4 gm/dl, suggesting drug induced anemia can be very severe. Hook worm infestation was also seen to

cause hemoglobin less than 4 gm/dl (66% of anemia due to hook worm infestation) (table-6). In Hook worm infestation peripheral smear was microcytic and hypochromic RBCs in all cases, 4 cases had eosinophilia. Out of 34 patients of Thrombocytopenia,15 had Nutritional anemia,4 had drug induced,4 had malaria,4 had NHL,2 had aplastic anemia,2 had TB,2 had CML and 1 had AML. Out of 26 patients of leucopenia,12 had Nutritional anemia,6 had NHL,4 had drug induced,2 had TB and AML and malaria 1 each. Out of 14 patients of pancytopenia,7 had Nutritional anemia, 2 had aplastic anemia,2 had NHL,2 had drug induced and 1 had TB. Almost all cases of dimorphic picture had nutritional anemia as the cause. R Athar showed in his study 80% of dimorphic anemia cases correlated with bone marrow but only 24% had low folate or B12 deficiency.¹² Out of 12 patients with Normocytic, normochromic picture 4 had Nonhodgkins lymphoma,2 had malaria,2 had hereditary spherocytosis,2 had drug induced and 2 had CML. All cases of macrocytic picture had nutritional anemia. Bone marrow picture showed megaloblastic anemia in 56%, followed by normocellular.

CONCLUSION

1. The most common cause of severe anemia with a Hemoglobin<7gm% in adults is due to Nutritional anaemia.
2. Malaria is second most common cause anemia in our study
3. Congestive heart failure is seen more frequently in later decades of life and is not seen in patients below 20years of age without underlying heart disease
4. Congestive heart failure is more frequently seen as the severity of anemia increases, being 60% in patients with hemoglobin less than 3gm%
5. Dimorphic picture on peripheral smear strongly correlates with the presence of Nutritional deficiency as the cause of anemia
6. Hook worm infestation is also a cause of anemia even in Urban slum adolescent patients.

ACKNOWLEDGEMENTS

We would like to thank Dr.Shashidhar Kamineni, Director of Kamineni Academy of medical sciences for providing material and lab support for the study, Dr.M.Swamy HOD department of general medicine for

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encouraging us in doing this study and also providing valuable inputs for the study. We would like to thank Dr.Ramakrishna for collecting the data and getting together resources.

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Source of Support: None Declared
Conflict of Interest: None Declared