

Etiological Factors, Clinico-Hematological Profile and Severity of Anaemia: A Hospital Based Study

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ABSTRACT

This hospital based cross-sectional study was undertaken to assess etiological factors, clinico-hematological profile and severity of anaemia among patients above 18 years of age in a tertiary care hospital in Bhopal. Consecutive patients diagnosed with anemia based on WHO classification were recruited from out patients and from admitted patients in wards of Department of Medicine, PCMS, Bhopal. A total of 142 patients aged between 18-83 years were recruited in the study. The mean age of the participants was 31.8 years and majority (64%) were females. The commonest presenting clinical feature was pallor (68%). The mean hemoglobin among the participants was 7.2 gm/dl. The mean MCV, MCH and MCHC were 72.7 fl, 24.8 pg and 27.3 gm/dl, respectively. Most(60%) patients had a peripheral smear picture of microcytic hypochromic anemia. The etiology was: iron deficiency anemia 75%, anemia with chronic diseases 14%, hemolytic anemia 4%, anemia associated with acute illness 4%. Pancytopenia was diagnosed in 11% and megaloblastic anemia in 5%. Severe anemia was diagnosed in 59% of patients. Iron deficiency is the most common cause of anemia in the study. Females are at more risk for severe anemia. Prevention and intervention programs for severe anemia are required with main focus on females.

KEY WORDS: anemia, iron deficiency, microcytic anemia, nutritional anemia

INTRODUCTION:

Anemia is a major public health problem, especially in low and middle-income countries like India, regardless of the fact that this problem is largely preventable and easily treatable. According to the World Health Organization (WHO), anemia is defined as hemoglobin (Hb) levels <12.0 g/dL in women and <13.0 g/dL in men. However, normal Hb distribution varies not only with sex but also with ethnicity and physiological status. New lower limits of normal Hb values have been proposed, according to ethnicity, gender, and age. Anemia is often multifactorial and is not an independent phenomenon^[1]. The causes of anemia include iron and other micronutrient deficiencies, acute and chronic infections, inherited or acquired disorders, etc^[2]. Patients with anemia present with similar clinical symptoms such as fatigue, breathlessness, and dizziness^[3]. Anemia also increases the susceptibility to different kinds of infections and impairs the work capacity^[4]. Severity of symptoms

caused by anemia is paralleled with the severity and speed of development of anemia^[5]. Severe anemia may predispose to infection and heart failure^[6].

Most common type of anemia in resource-poor settings is nutritional anemia. Nutritional anemia can be due to iron deficiency (most common cause), folic acid deficiency, vitamin B12 deficiency or may be combination of these factors, which can present with dimorphic picture^[7]. These conditions are seen in all types of medical practice ranging from neonatology to geriatrics and public health and are an ongoing concern to all physicians. Other types of anemia include hemolytic anemia, which can be either congenital or acquired, aplastic anemia, anemia due to blood loss and anemia of chronic disease^[7,8]. Congenital causes include membrane defect, hemoglobin defects and enzyme defect while acquired causes can be immune or non-immune. are the some other types of anemia^[7,8].

The present study was undertaken to determine the etiological factors, clinical features, types and grades of anemia in a heterogeneous adult population of the out patient clinics and among admitted patients of Department of Medicine, Peoples College of Medical Science(PCMS), Bhopal.

MATERIAL AND METHODS:

This was an observational cross-sectional

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study conducted between January 2018 and May 2018. The study participants were consecutive patients aged above 18 years, seeking healthcare in either the out patient clinics or from the consecutive admitted patients in the wards of Department of Medicine, PCMS, Bhopal.

The inclusion criteria were: 1) Patients of age 18 years and above; 2) Patients with symptoms, signs of anemia and diagnosed anemia based on WHO criteria. The exclusion criteria were: 1) Anemia due to acute blood loss; 2) Pregnant women.

Sample size calculation was done based on the review of haemoglobin values for one month in outpatients and among the admitted patients. This chart review provided the prevalence of all cause anaemia as 50%. Thus, to detect at least a 10% difference around the proportion of 0.5 with power of 90%, two-sided alpha of 0.05, the minimum sample size required was 113 patients.

A pretested structured questionnaire was used for this study. A detailed history, and thorough clinical examination was done for all included patients in the study and was recorded in the questionnaire. Written informed consent was obtained from all the participants. WHO criteria for anemia was used for the diagnosis and WHO grades of severity was used grading. All the patients included in the study, underwent following investigations: Haemoglobin, RBC count, leukocyte count, platelets count, PCV (Hematocrit), reticulocyte count, MCV, MCH, MCHC, Peripheral smear examination red cell morphology, haemoglobin electrophoresis, test for sickling, G-6-PD deficiency test.

Data was collected in had copies and were entered in EPI data software and transferred to Stata. Analysis was done using Stata 13 (Stata College Station, TX: Stata Corp LP). The study was conducted in accordance with the Declaration of Helsinki, and the study was approved by institutional ethics committee.

RESULTS:

The study included 142 patients. The age of the study participants was between 18 to 84 years. The majority of patients were from age group 18-35 years 55% (n= 78). The mean age of the study participants was 31.8 years. Majority of participants were females 64% (n=91). The common presenting clinical features were – pallor 68%(n=96), weakness 54% (n=76), fatigue 32% (n=46), pain in abdomen 27% (n=39), fever 22% (n=31), reduced appetite 18% (n=26) swelling 18% (n=25) and breathlessness 12% (n=17).The commonest etiological factor leading to

anemia was iron deficiency anemia 75% (n=107), followed by anemia due to chronic diseases 14% (n=20), and acute illnesses 4% (n=6), and hemolytic anemia 4% (n=5) and megaloblastic anemia 3% (n=4). The acute infections included: urinary tract infections (n=2), pulmonary edema (n=1), upper respiratory tract infections (n=1), severe-sepsis (n=1) and pneumonia (n=1). The causes of hemolytic anemia were: a) congenital causes: sickle cell anemia (n=2) and thalassemia (n=2) and b) acquired cause: malaria (n=1). The comorbid diseases included: hypothyroidism (n=7); type 2 diabetes mellitus (n=3), chronic liver diseases (n=3), renal disorders with hypertension (n=5), inflammatory bowel disease (n=1), and chronic obstructive pulmonary diseases (n=1).The mean hemoglobin among the study participants was 7.2 gm/dl. The mean MCV, MCH and MCHC 72.7 fl, 24.8 pg and 27.3 gm/dl, respectively. A total of 60% of patients had microcytic hypochromic anemia and 25% had normocytic normochromic anemia. Pancytopenia was diagnosed in 11% of the patients and 5% had megaloblastic anemia. Severe anemia was found in 59% (n=84) of patients and moderate anemia in 39% (n=55).

Table 1: Distribution of anemia according to gender among enrolled participants.

Variable	N=142	Percentage
Sex		
Male	51	36%
Female	91	64%

Table 2: Distribution of anemia according to clinical presentation among enrolled participants.

Clinical presentation	N=142	Percentage
Fever	31	22%
Reduced appetite	26	18%
Weakness	76	54%
Fatigue	46	32%
Dizziness	16	11%
Pain in abdomen	39	27%
Pallor	96	68%
Jaundice	11	8%
Swelling	25	18%
Breathlessness	17	12%

DISCUSSION:

Anemia due to iron deficiency is the most widespread disease globally. About 50 per cent of women of reproductive age and 26 per cent of men in the age group of 15-59 years are anemic (ACC / SCN, 1987 and Beard, 2005). The findings are in line with the present study i.e. 55% patients in present study were belonging to 18-35 years of age. The complica-

Table 3: Distribution of anemia according to etiology among enrolled participants.

Diagnoses	N=142	Percentage
Iron deficiency anemia	107	75
Anemia due to chronic disease	20	14
Anemia due to acute disease	6	4
Hemolytic anemia	5	4
Megaloblastic anemia	4	3

Table 4: Distribution of anemia according to WHO grade for anemia among enrolled participants.

Grades of anemia	N=142	Percentage
Mild anemia	3	2
Moderate anemia	55	39
Severe anemia	84	59

Table 5: Classification of anemia according to peripheral smear examination among enrolled participants.

Peripheral smear findings	N=142	Percentage
Microcytic hypochromic	85	60
Normocytic normochromic	35	25
Megaloblastic	7	5
Pancytopenia	15	11

-tions of severe anemia include compromising the work performance, reduction with immune competence and increasing resistance to infection (ACC/ SCN, 1987). The main burden of anemia is on women of reproductive age group. The present study also emphasizes the same as 64% of participants were females with a age group of 18 to 35 years. Similar findings were reported in a study done in Iran by Sadeghian et al^[10]. The preponderance of the anemia in the reproductive age group suggests multi factorial etiology in women. As the pregnant women were excluded from the study, the other factors which precipitate anemia are nutritional factors leading to iron deficiency anemia (75%), chronic (14%) and acute illnesses (4%). In present study the hypothyroidism (n=7), type 2 DM (n=3) chronic liver diseases (n=3) renal disorders (n=5) inflammatory bowel disease (n=1) and COPD (n=1).

Anemia of chronic disease is the second most common form of anemia, after iron deficiency anemia^[11]. All chronic infections can cause anemia^[12]. The high prevalence of infectious diseases worldwide makes this the most common form of anemia after nutritional iron deficiency anemia. This type of anemia is particularly associated with infections accompanied by significant inflammatory features.

The other etiological factors in the present study were acute illnesses i.e. 4% like UTI, pulmonary edema, URTI, severe-sepsis and pneumonia.

Hemolytic anemia constituted 4%, which included sickle cell anemia, halassemia and malaria.

The common clinical features with which participants presented were – pallor 68% (n=96), weakness 54% (n=76), fatigue 32% (n=46), pain in abdomen 27% (n=39), fever 22% (n=31), reduced appetite 18% (n=26) swelling 18% (n=25) and breathlessness 12% (n=17). The commonest presentation was pallor.

In a study done in Sewagram India by Kalantri et al found that the tongue pallor outperformed other pallor sites and was also the best discriminator of anaemia at haemoglobin thresholds of 7 g/dL and 9 g/dL (area under the receiver operating characteristic curves (ROC area = 0.84 [0.77, 0.90] and 0.71[0.64, 0.76]) respectively^[13].

Microcytic hypochromic picture was most common finding on peripheral smear examination (60%). Similar findings were seen in a study conducted at LN Medical College, Bhopal by Ratre et al^[14]. Normocytic normochromic anemia was found in 25% of patients in present study. However, in the study done by Ratre et al only 6% patients had Normocytic normochromic anemia. Pancytopenia was found among 11%, which is contrary to study done by Ratre et al (2%)^[14].

Megaloblastic anemia was found in 5% of patients in present study which suggests dietary deficiency of folic acid and cobalmine. In our study severe anemia was found in 59% of the cases followed by moderate anemia, which was found in 39% of the patients. On the contrary Ratre et al found moderate anemia as the commonest grade followed by severe anemia 57% vs 41% respectively.

CONCLUSION:

Iron deficiency anemia was the commonest etiological factor in the present study with Microcytic hypochromic picture in the peripheral picture and values of MCV, MCH and MCHC was found in 64% of non pregnant females. This requires early diagnosis, treatment and preventive measures to be taken amongst women of reproductive age group. More attention is needed not only in dietary supplementation but also supplementation in the form of ferrous sulphate tablets to these women.

LIMITATION:

Further investigations in the form of serum iron studies, bone marrow examination, stool for ova and cyst, stool for occult blood, serum vitamin B12 level, serum folic acid level, Schilling test for

absorption of vitamin B12 are required but were not done in present study because of financial constraints.

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