

Original research article

Prevalance of anaemia among industrial employees –a prospective study

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ABSTRACT

Introduction; Anaemia is a major health problem in India..Anaemia reduces the work capacity of individuals and entire population and causes serious economic consequences and obstacles to national development¹

Objective of the study: To estimate the prevalence of anaemia among patients admitted in medicine ward and attending medicine OPD in Government medical college and ESI Hospital,Coimbatore.

Men and materials: A study was conducted among 1689 patients in medicine ward and 26334 in medicine OPD for five months from January 2018 to May 2018.Complete blood count was done and peripheral smear study by pathologist was done in those patients diagnosed with anaemia.

Results: The prevalence of anaemia was found to be 13.8% among Out patients and 12.5% among all admitted patients .Among Out patients prevalence of anaemia was 8% among men and 23% in women. Among admitted patients the prevalence was 4.6% among men and 24% among women.Iron deficiency anaemia was the most common(77%).

Conclusion: Anaemia was six times more common in female compared to male patients Iron deficiency anaemia was the most common type.Health programmes should focus more on women labourers and give fortified diet in their work place.

INTRODUCTION:

Anaemia is a major health problem in India.Anaemia reduces the work capacity of individuals and entire population and causes serious economic consequences and obstacles to national development.The loss of gross domestic product due to anaemia was estimated as Rs 1.50 lakh crore in 2016, more than three times the health budget for 2017-18. It causes 17 percent loss in productivity among workers engaged in heavy physical labour.

Finding of the table.In India, more than half (51%) of all women of reproductive age group have anaemia and 22% of adult women are overweight. Government has initiated many programmes to control anaemia like²:But iron-deficiency anaemia has remained India's top cause of disability.So to prevent anaemia and utilize the full potency of work force we have to start a specific nutritional programme in factories and work places.

METHODS:

The study was conducted among adult patients attending medicine OPD and those admitted in medicine ward in government medical college and ESI Hospital,Coimbatore,Tamilnadu between January 2018 to May 2018..The study population was workers and their family members.Surgical and gynaecological causes for anaemia were excluded. The cut off value for haemoglobin was 13.5 g/dL for men and 12.5 g/dL for women.

RESULTS:

The Study included 26334 patients attending Medicine OPD and 1689 patients admitted in Medicine ward in government medical college and ESI Hospital,Coimbatore between January to may 2018.Out of this in OPD 16196 were male and 10138 were female .Among inpatients 987 were male and 702 were female patients.

In OPD 3628 patients were anaemic,1296 (8%) were male and 2332(23%) were female.

212(12.5%) patients were found to have anaemia. 166 (24%)female patients and 46 (4.6%)male patients had anaemia.

	Inpatients	Outpatients
Total	1689	26334
Male	987	16196
Female	702	10138
Total cases of Anaemia	212(12.5%)	3628(13.8%)
Male	46(4.6%)	1296(8%)
Female	166(24%)	2332(23%)

TYPE OF ANAEMIA

Among outpatients 2685(74%) had iron deficiency anaemia,253(7%) had macrocytic anaemia,326(9%) patients had dimorphic anaemia and 399 (11%)patients had normocytic normochromic anaemia.

Among inpatients 165 patients(77 %) had iron deficiency anaemia,5 patients(2.5%) had macrocytic anaemia, 7 patients (3.5%) had dimorphic anaemia and 35 patients (17%) had normocytic normochromic anaemia.

Type of anaemia	INPATIENTS	OUTPATIENTS
Iron deficiency anaemia	165(77%)	2685(74%)
Macrocytic Anaemia	5(2.5%)	253(7%)
Dimorphic Anaemia	7(3.5%)	326(9%)
Normocytic Normochromic Anaemia	35(17%)	399(11%)

SEX DISTRIBUTION

Out of 165 patients with iron deficiency anaemia 108(83%) were female and 22(17%) were male. All 5 patients with macrocytic anaemia were male and vegetarians. Out of 7 patients with dimorphic anaemia 5 were male and 2 were female. Out of 35 patients with normocytic normochromic anaemia 26 were female and 9 were male.

	OUTPATIENT	OUTPATIENT	INPATIENT	INPATIENT
Type of Anaemia	MALE	FEMALE	MALE	FEMALE
Iron Deficiency	830(64%)	2175(81%)	29(60.5%)	137(82.5%)
Macrocytic	388(3%)	933(4%)	5(10%)	0
Dimorphic	181(14%)	1399(6%)	5(10%)	2
Normocytic Normochromic	246(19%)	210(9%)	9(19.5%)	26

In both male and female patients iron deficiency anaemia was the most common type with 60.5% and 64% among male patients and 82.5% and 81% among female patients. Normocytic normochromic anaemia was the next common type. Macrocytic anaemia was the least common type.

DISCUSSION:

Anemia is defined as decrease in red blood cell mass. In anemia, a decrease in the number of RBCs transporting oxygen and carbon dioxide impairs the body's ability for gas exchange.³ The decrease may result from blood loss, increased destruction of RBCs (hemolysis), or decreased production of RBCs. Anemia is a sign that needs investigation to find the underlying etiology. Anemia is usually discovered and quantified by measurement of the RBC count, Hb concentration and hematocrit (Hct). Basically, only three causes of anemia exist: blood loss, increased destruction of RBCs (hemolysis), and decreased production of RBCs.⁴

CAUSES OF ANAEMIA:

DIFERRENTIAL DIAGNOSIS FOR ANAEMIA IN CHILDREN

Differential diagnosis of acute anemia include

Acute hemorrhage
Anemia of inflammation/infection
Aplastic anemia, due to blood loss
Autoimmune hemolytic anemia with acute hemolysis
Erythrophagocytosis (hemophagocytic lymphohistiocytosis [HLH])
G-6-PD deficiency, hemolytic episode
Hereditary spherocytosis, splenic sequestration, or acute hemolytic episode
Microangiopathic hemolytic anemia (DIC, Kasabach-Merritt phenomenon)
Paroxysmal cold hemoglobinuria
Paroxysmal nocturnal hemoglobinuria (PNH)
Hemolytic disease of newborn
Hemolytic-uremic syndrome
Acute porphyria

Differential diagnosis of chronic anemia include

Chronic renal failure
Congenital dyserythropoietic anemia
Fanconi anemia
Iron deficiency anemia
Diamond-Blackfan anemia
Osteopetrosis
Sideroblastic anemia
Unstable hemoglobinopathy
Thymoma
Transient erythroblastopenia of childhood
Pyruvate kinase deficiency
Evans syndrome (ITP and autoimmune hemolytic anemia)
Hemoglobin H disease
Hypothyroidism
Myelofibrosis
Aplastic or hypoplastic anemia
Autoimmune hemolytic anemia

MCV less than 80 fL or microcytic anemia etiologies are as follows:

Iron deficiency
Thalassemia
Anemia of chronic disease
Sideroblastic anemia
Anemia associated with copper deficiency
Anemia associated with lead poisoning

MCV greater than 100 fL or macrocytic anemia etiologies are as follows:

Folic acid deficiency anemia
Vitamin B-12-deficiency anemia
Drug-induced hemolytic anemia (eg, zidovudine)
Anemia associated with reticulocytosis
Anemia associated with liver disease
Anemia associated with ethanol abuse
Anemia associated with acute myelodysplastic syndrome

MCV 80-100 fL or normocytic anemia etiologies are as follows:

Hemorrhagic anemia
Early iron deficiency anemia
Anemia of chronic disease
Anemia associated with bone marrow suppression
Anemia associated with chronic renal insufficiency
Anemia associated with endocrine dysfunction
Autoimmune hemolytic anemia
Anemia associated with hypothyroidism or hypopituitarism
Hereditary spherocytosis
Hemolytic anemia associated with paroxysmal nocturnal hemoglobinuria

Differential diagnosis of anemia in the elderly include the following

Acute lymphoblastic leukemia	Lymphoma
Acute myelogenous leukemia	Medications
Anemia of chronic inflammation/anemia of chronic disease from infection, malignancy, or rheumatologic disease	Multiple myeloma
Anemia of chronic renal insufficiency	Myelodysplastic syndromes
Aplastic anemia	Myeloproliferative syndromes
Blood loss	Neoplasia (nonhematologic)
Chronic lymphocytic leukemia	Paroxysmal nocturnal hemoglobinuria
Chronic myelogenous leukemia	Pernicious anemia
Folic acid deficiency	Splenomegaly
Hairy cell leukemia	Thalassemia trait
Hemolytic anemia	Thrombotic thrombocytopenic purpura
Hyperthyroidism	Unexplained anemia of the elderly
	Vitamin B-12 deficiency

Chronic Anemia Differential Diagnoses

Hemophilia, type A, type B
Hemorrhoids
Henoch-Schönlein purpura
Inflammatory bowel disease
Malaria
Methemoglobinemia
Mononucleosis
Mycoplasma pneumonia
Cushing syndrome
Alcohol and substance abuse
Coccidioidomycosis
Dengue fever
Disseminated intravascular coagulation
Dysfunctional uterine bleeding
Dysmenorrhea
Sarcoidosis
Systemic lupus erythematosus

Anaemia can be classified as :

Microcytic, < 84 fl

Macrocytic > 96 fl

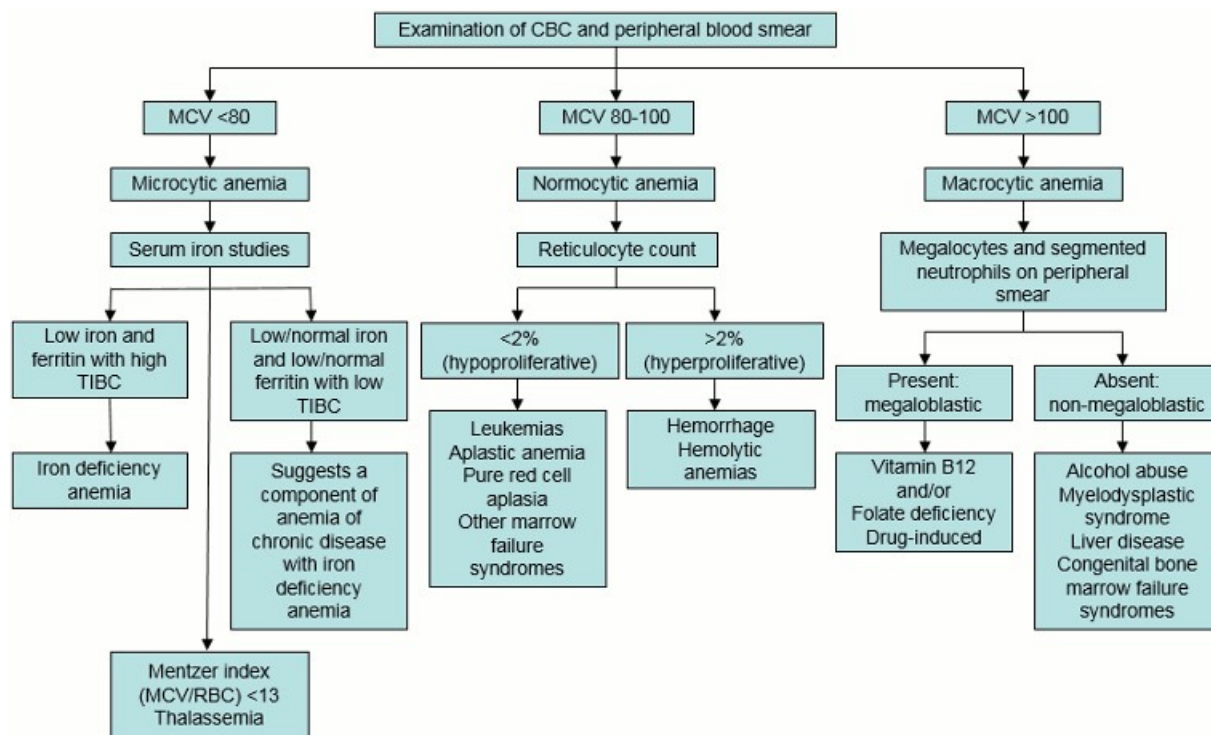
Normocytic 84-96 fl.

MICROCYTIC ANAEMIA <84 fl	MACROCYTIC ANAEMIA >96 fl	NORMOCYTIC ANAEMIA
IRON DEFICIENCY	FOLIC ACID DEFICIENCY	HEMORRHAGIC ANAEMIA
THALASSEMIA	VITAMIN B12 DEFICIENCY	CHRONIC DISEASE
ANAEMIA OF CHRONIC DISEASE	ETHANOL ABUSE	CHRONIC RENAL INSUFFICIENCY
SIDEROBLASTIC ANAEMIA	LIVER DISEASE	HYPOTHYROIDISM
COPPER DEFICIENCY	DRUG INDUCED	BONE MARROW SUPPRESSION
LEAD POISONING	ACUTE MYELODYSPLASTIC SYNDROME	HEREDITARY SPHEROCYTOSIS

Anaemia can also be classified according to the cause ⁵:

GENETIC CAUSES	PHYSICAL CAUSES	CHRONIC DISEASE	NUTRITIONAL	INFECTION
THALASSEMIA	TRAUMA	RENAL	IRON	MALARIA
A BETA LIPOPOTENEMIA	BURNS	HEPATIC	VITAMIN B12 DEFICIENCY	CYTOMEGALO VIRUS
HEMOGLOBINOPATHIES	FROST BITE	CHRONIC INFECTION	FOLATE DEFICIENCY	INFECTIOUS MONONUCLEOSIS
FANCONI ANAEMIA	PROSTHETIC VALVES	COLLAGEN VASCULAR DISEASE	MALNUTRITION	TOXOPLASMOSES

APPROACH TO THE DIAGNOSIS:



In this study in a tertiary care centre among labourers and their family members iron deficiency anaemia was the most common type of anaemia. In this retrospective observational study using routine clinical data from patients admitted in government medical college and ESI Hospital,Coimbatore anaemia was present among 24 % females and 4.6% males.In female iron deficiency anaemia was 82.5% and in males 60.5%.

The high proportion of microcytic anaemia indicates that iron deficiency is the main cause of anaemia.Many Indian studies have also shown high prevalence of iron deficiency anaemia . The high prevalence of anaemia among workers and women in childbearing age has important public health implications. Anaemia leads to loss of work force and productivity.It causes cognitive deficit among malnourished children. Anaemia in pregnant women causes low birth weight^[7].The high incidence of anaemia among workers may be due to their dietary habits.Most workers skip the meals to attend the work in time.They also eat junk food as they cant cook food in their home.Many workers stay in hostels which don't provide nutritious food ⁸.

New schemes targeting the worker population should be started by the government with active participation of Employees.High value nutrients should be given to the workers in their work place.Regular deworming should be

done. Recent studies have shown the poor bioavailability of vitamin B12 in the typical Indian vegetarian diet [9] and substantial prevalence of vitamin B12 deficiency in Indian patients with anaemia [10].

The study has some limitations. We used data from patients admitted in the hospital to assess the prevalence of anaemia in the population. This might have led to an under estimation of anaemia as most people get admitted only when they are sick. So the incidence of mild and moderate anaemia will be certainly more than this study. The results of this study can be used to prevent and treat anaemia among workers.

CONCLUSION:

In our study iron deficiency anaemia was the most common type followed by normocytic anaemia. Anaemia was six times more common in female compared to male patients. The results are similar to previous studies in our country. The prevention of anaemia will not only help the individuals but will also lead to increase in productivity. This will help save man hours and will help in increase in GDP of our country. Frequent deworming, SALT fortified with iron, promoting natural foods like jaggery, groundnut, leafy vegetables will improve the outcomes. These should be started as regular food habits from childhood.

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