Original Article

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Clinicopathological Profile of Anaemia Cases in Adults (20-60 years) Attending a Rural Hospital

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ABSTRACT

Background: Anemia is a worldwide problem with highest incidence in developing countries. India has the highest prevalence of nutritional anemia predominantly in women and children.

Methods: An observational and analytical study was carried out for period of 12 months. We studied 261 adult patient for typing the anemia. We perform the hematology parameter by automated hematologyanalyzer,For confirmation PBS and bone marrow examination, serological test like serum iron profile , vit B12 and folic acid levels in blood is done

Result: Total 261 cases of anemia included in the study. Microcytic hypochromic anemia were63.2 %of cases, macrocytic anemia cases were 36.77% of cases. Large number of iron deficiency anemia's were seen in female with reproductive age group and megaloblastic anemia seen with age 50-60 years of age in both sex.

Conclusion: For the diagnosis of nutritional anemia haemogram by automated hematology parameter, PBS, serum iron profile , serum vit B12 and folic acid is required

Keywords: *Iron Deficiency Anemia, Megaloblastic Anemia, Nonmegaloblastic Macrocytic Anemia, Nutritional Anemia.*

Introduction

In 1992, World Health Organization(WHO) global estimates of anemia prevalence averaged 56%, with range of 35-75% depending on geographic location. Prevalence of anemia seen in south Asia, among highest in world. In India recent data from national family health survey 1998/1999 stated that woman with reproductive age have higher prevalence rate concentration and impaired capacity to transport oxygen.[1] It has multiple factor such as genetic- haemoglobinopathies, infectious- malaria, intestinal helminthes and nutritional- which includes iron deficiency as well as deficiency of vitamins such as folate vitamin A, B12 and minerals like cupper. [2]

The evaluation of cause of anemia includes complete blood count, peripheral smear, and reticulocyte count and serum iron indices. [3] As per WHO classification, majority of subject 41.3% suffered from moderate anemia, while 18.4and 0.4 suffer from mild and severe anemia. In the study of NeelamDeshpande et al 70% of anemic subject had low MCV with high RDW suggestive of iron deficiency.[4]-

Uma Khandri and Archana Sharma stated that megaloblastic anemia was diagnosed from complete blood count, red cell indices, blood film examination and assay of two vitamins. Marrow examination was not essential for diagnosis. Cobalamine deficiency was responsible for megaloblastic anemia in majority of patient (65%), combined (folate and cobalamine) seen in 12% and pure folate deficiency in 6% cases.[5]

Hence the present study was carried out to find out commonest type of anemia in the rural population.

Materials and Methods

This is prospective study comprised of adult from outpatientand indoor department of a tertiary care in teaching hospital in Maharashtra, India. The period of study was from January 2015 to December 2015. Total261 patients with anemia's were selected for study with informed consent.

Selection Criteria for cases

Inclusion criteria(cases included in study)

- Male and female patient in the age group 20 to 60 years.
- Patient with HB value 10gm/dl or less.

Exclusion criteria ;(cases excluded from study)

- Pregnant and lactating women due to physiological anemia
- Patient who were on treatment / therapy for any reason

Haemogram were performed by automated hematologyanalyzersysmex XN 1000. This instrument performed hematology analysis according to

hydrodynamic focusing, flow cytometry method and SLS hemoglobin method.

Microcytic hypochromic anemia and macrocytic anemia were included in the study. Cases are classified in to microcytic and macrocytic anemia on the basis of MCV. Microcytic anemia is identified when MCV is <80fl, macrocytic anemia is identified when MCV exceeds 100fl, increased RDW in both and confirmed by Peripheral Blood Smear (PBS). PBS examinations were performed, we observed for anisopikilocytes, microcytes and macrocytes.[6]

Additional 5ml blood sample collected for special investigation for S. ferritin, S iron, TIBC, % saturation for confirmation of microcytic anemia and S vit B12 and S folic acid estimation in macrocytic anemia.

Values done by automated hematologyanalyzer correlated withPBS findings, S. iron profile value, Vit B12 and folic acid levels. In cases of Hb deficiency syndrome cases with normal RDW and increased reticulocyte count, reticulocyte count was performed manually using supravital stain with methylene blue- showed dark blue granules in the cell identified as reticulocyte. Advised them to perform hemoglobin electrophoresis.

Result

Total number of cases in study: 261

Table 2 Distribution of cases according to age groups in microcytic hypochromic anemia:

Large number of iron deficiency anemia seen in female with age group of 20-29 years, followed by age group of 30-39 years, in reproductive age group there is no specific group affected in other type of anemia's.

Table3 Distribution of cases according to age group in macrocytic anemia

In nonmegaloblastic macrocytic anemia, cases with increased reticulocyte were ask to investigate for hemolyticanemia.

Table 4 Clinical features of microcytic hypochromic anemia:

Table 5 Clinical features -Macrocytic anemia:

Table 1: Age and sex distribution of anaemia in study;

Serial number	Age group in years	Male	Female
1	20-29	22(8.42%)	73(27.96%)
2	30-39	18(6.89%)	40(15.32%)
3	40-49	24(9.19%)	18(6.89%)
4	50-60	32(12.26%)	34(13.02%)
Total		**96(36.78%)**	**165(63.21%)**

Table 2: Distribution of cases according to age groups in microcytic hypochromic anaemia:

Age group in years	Total number of cases with microcytic hypochromic anaemia		Iron deficiency anaemia		Anaemia of chronic disease		Haemoglobin deficiency	
	Male	Female	Male	Female	Male	Female	Male	Female
20-29	11	65	04	54	05	7	02	4
30-39	10	32	03	26	04	4	03	2
40-49	05	11	02	04	03	4	00	3
50-60	10	21	02	10	05	7	03	4
Total	36 (13.79%)	129 (49.42%)	11 (4.21%)	94 (36.01%)	17 (6.51%)	22 (8.42%)	08 (3.06%)	13 (4.98%)

Table3: Distribution of cases according to age group in macrocytic anaemia :

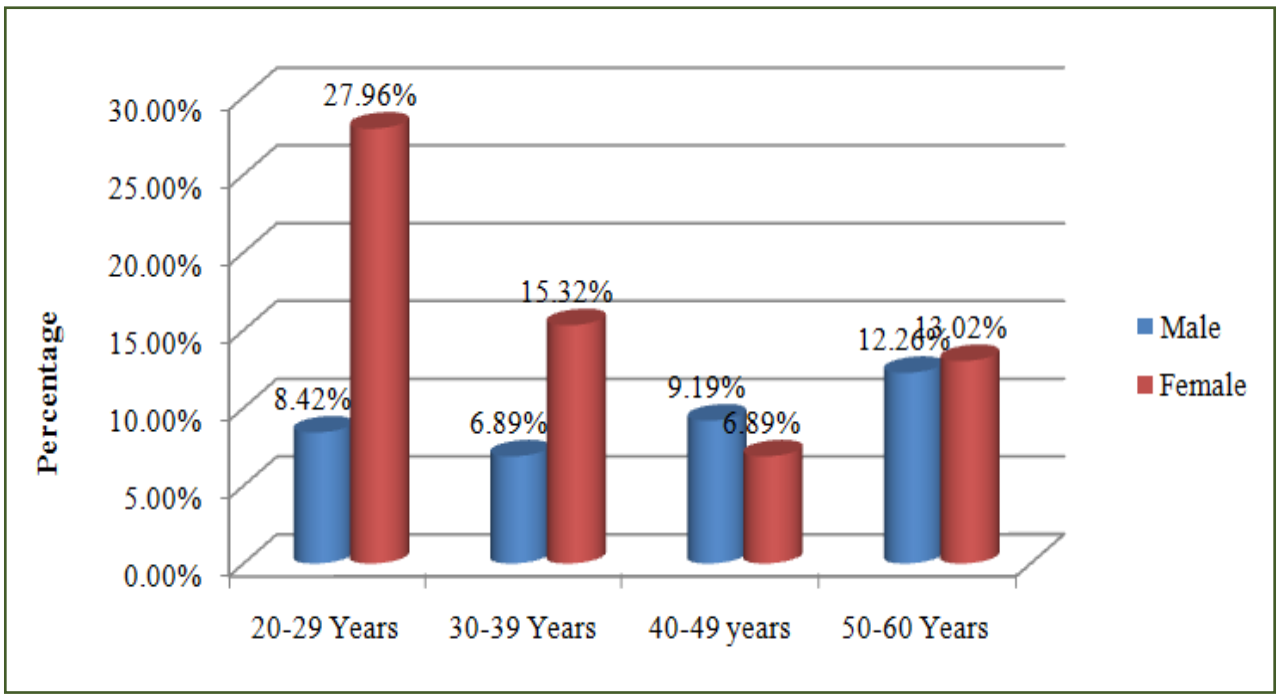
Age group in years	Total number macrocytic anaemia		Megaloblasticanaemia		Nonmegaloblastic macrocytic anaemia	
	Male	Female	Male	Female	Male	Female
20-29	11	08	07	06	04	02
30-39	08	08	04	07	04	01
40-49	19	07	14	07	05	00
50-60	22	13	17	10	05	03
	60 (23.98%)	36 (13.78%)	42 (16.09%)	30 (11.49%)	18 (6.89%)	06 (2.29%)

Table 4: Clinical features of microcytic hypochromic anaemia

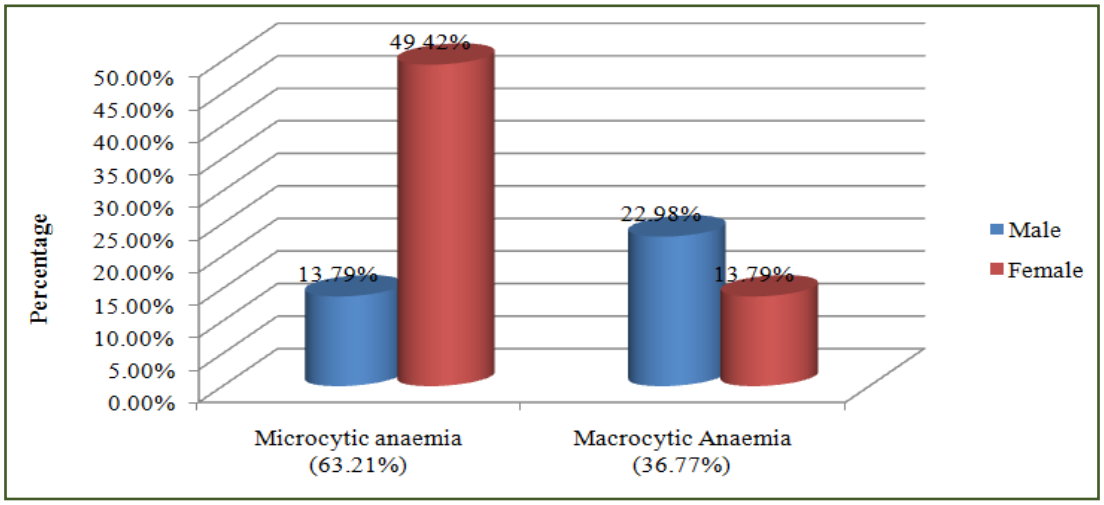
Sr no	Symptoms	Number of cases	Signs	Number of cases
1	Fatigue, palpitation, weakness	68	Pale conjunctiva, pale tongue and pallar	83
2	Menstrual bleeding	38	Angular stomatitis	12
3	Urinary tract infection	12	Chronic renal disease	18
4	Gastrointestinal bleeding, fresh blood in stool	15	Lower respiratory tract infection	23
5	Chronic respiratory infection	11	Haemorrhoids, GI malignancy, maleana	10
6	Post-menopausal bleeding	14	Growth endometrium/cervix	19
7	Joint pain	12	Rheumatoid arthritis	08
8	Dyspnea on exertion	28	DUB	32

Table 5: Clinical History-Macrocytic anaemia.

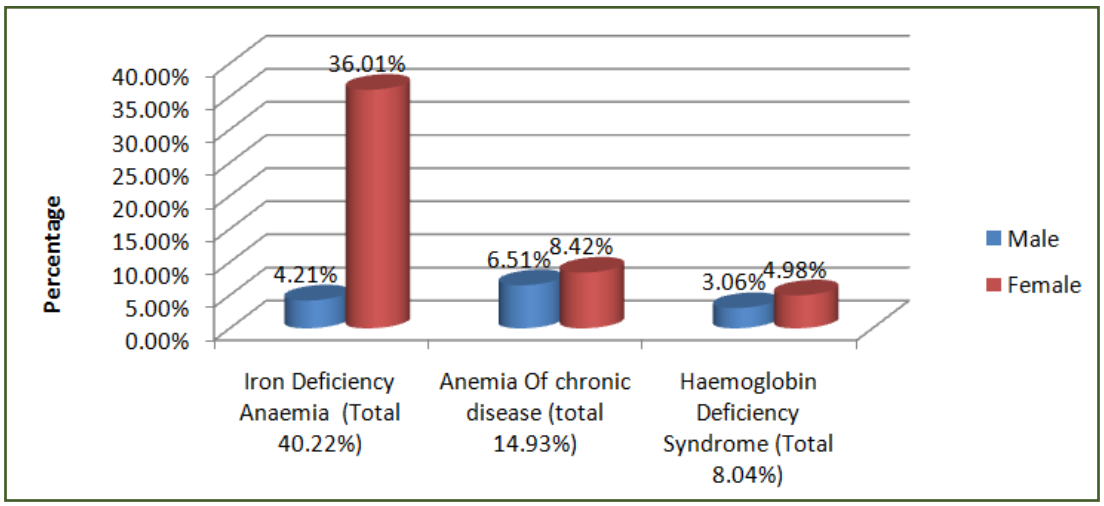
Sr no	Symptoms	Number of cases	Signs	Number of cases
1	Lethargy	32	Glossits	10
2	Tingling and numbness	18	Pallar	2
3	Abdominal pain	12	Angularcheilosis	12
4	Fever	08	Sleenomegaly	04
5	Weightloss, loss of appetite	19	Hepatomegaly	03
6	Alcoholism	14	Neural manifestation-Myopathy	05
7	Pure vegetarian	07	Ecterus	03
8	History of haemolyticanaemia	06		



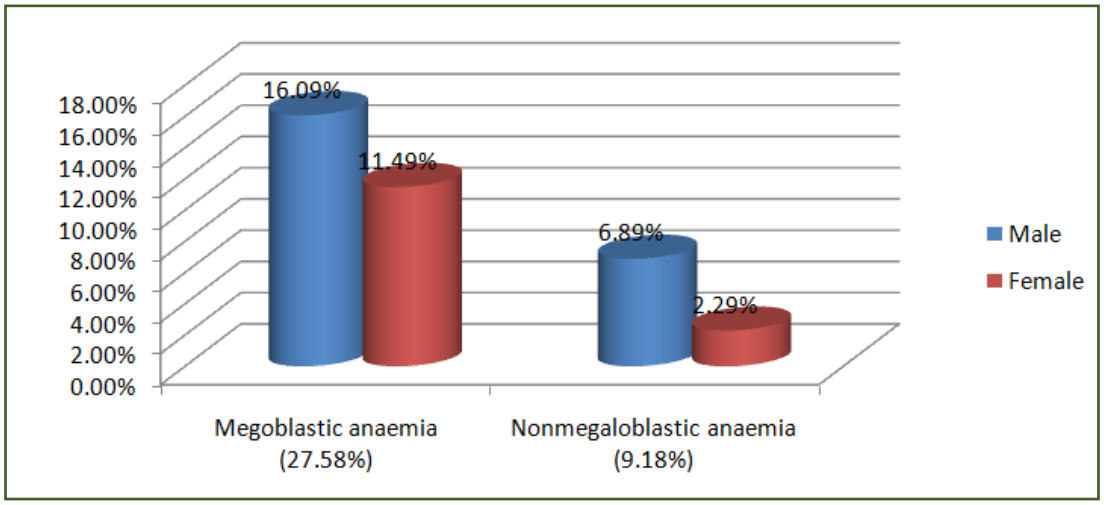
Graph 1: Distribution of cases of anemia in the study: Total= 261.



Graph 2: Distribution of cases according to type of anemia.



Graph 3: Distribution of cases of Microcytic hypochromic anaemia: Total; 165.



Graph4: Distribution of cases with Macrocytic anaemia:Total;96.

Discussion

In women of childbearing age, the anemia prevalence is 30.2%. Overall468.4 million women of childbearing age are anemic. The highest prevalence is found in Africa (47.5%) and in South-East Asia (35.7%). It is 17.8% in America, 14% in the United Arab Emirates; and from a low of 11% in Egypt to over 40% in the Syrian Arab Republic. Iron deficiency anemia was considered as important contribution of anemia in global burden of anemia in WHO report 2002. [7]

National Family Health survey in 2005-2006 showed, the prevalence of anemia was 55% in female aged 15-49 years and 24% in male aged15-49 years. According to World Health Organization, there are two billion people with anemia in the world and half of anemia due to iron deficiency. [8]

In developing countries prevalence of nutritional anemia is 40%, among the various nutritional anemia iron deficiency anemia is most commonIt is the most common nutritional disorder worldwide and accounts for approximately one-half of anemia cases. [4, 9]In our study male was 36.78% and female was 63.21%. Iron deficiency anemia was 40.22%,more commonly seen in female with reproductive age group.

Patient with iron deficiency anaemia has history of decreased work or exercise tolerance, shortness of breath, palpitation. (6)In the etiologies for iron deficiency anemia Terri D et al and Mathew W Short et al stated that itinclude blood loss like menorrhagia, epistaxis, melena, hematuria, and hematemesis.In developing countries decreased intake is primary cause of iron deficiencyanemia.. Other causes of anemia include chronic blood loss from gastrointestinal tract, gynecological disorder and genitourinary blood loss. Gastrointestinal bleeding can be acute or chronic. Patient present with maroon coloured stool or blood in stool. Bleeding may be associated with NSAID or aspirinIngynecological disorder postmenopausal women with excessive menstruation seen. [3,9]

In present study in microcytic hypochromic anemia patient present with symptoms like fatigue, palpitation, menstrual bleeding, few of them present with joint pain, Gastrointestinal bleeding, dyspnoea on exertion which is similler to finding of Terri D et al[3] and Mathew W Short et al[9]

According to Mathew W Short et al diagnosis of iron deficiencyanemia requires laboratory confirmed evidence of anemia as well as evidence of low iron stores. Values consistent with iron deficiency include a low serum iron level, low transferrin saturation and high total iron binding capacity. Serum ferritin is particularly valuable in anemic patient because level below 12ug/L is diagnostic of iron deficiency anemia[9,10,11]

In our study, 40.22%cases were with iron deficiency anaemia, 36.01% arefemale and04.21% aremale, showed a decreased parameter below the normal range like serum iron, ferritin, transferrin saturation and increased TIBC above the normal level, similarfinding with Mathew W Short et al[9]

Other causes of microcytosis include chronic inflammatory state, lead poisoning and thalassemia and sideroblastic anemia. [9]Hemoglobin level less than 9 gm/dl in patient with microcytic anemia and normal iron studies suggest Hb H disease, B thalassemia major or intermedia. An increased RDW may be particularly helpful in distinguish between iron deficiency and thalassemia minor. A bone marrow aspirate for iron stain remains gold standard for iron deficiency anemia in difficult cases. [12]We performed Prussian blue stain for iron store in cases wherever it is possible in Iron deficiency anemia and showed decreased grading.

Ferritin is acute phage reactant protein, serum levels tend to be elevated in inflammatory condition.[12,13,14,15] Ferritin is elevated in inflammation, autoimmune disorder, chronic infection and liver disease. Elevated levels of ferritin well established in still's disease, multiple sclerosis and rheumatoid arthritis. Ferritin also plays an important role in host immune response is evident from its increased concentration.[13] In anemia of chronic inflammation ferritin levels rises moderately achieving mean level such as 300-400ug/L Ferritin criteria used for recognition of coexisting iron deficiency anemia in patient who have chronic inflammation.In the study of Sheetal Patel et al observed massive hyperferritinemia in adult onset stills desease.[14]

In our study 14.93% of cases showed increased ferritin above 100ng/ml,8.42% are female and 6.51% are male. Casesinclude various inflammatory conditions like respiratory disease, chronic urinary disease, rheumatoid arthritis and 2 cases of heart diseases

Megaloblastic anemia is more common in vegetarian than nonvegetarian. Folic acid deficiency more commonly seen in elder, children, pregnant women and haemolyticanaemia. Clinical feature of megaloblasticanaemia are anorexia, irritability, fatigue, palpitation. Commonest physical finding was pallor, fever, generalized weakness, splenomegaly, hepatomegaly and hypopigmentation. Common neurological manifestation of vit B12 deficiency includes parasthesia, weakness, gait abnormalities and behavior changes. [16,17,18] In the present study most of

patient with macrocytic anemia presented with lethargy, tingling numbness, loss of appetite, loss of weight, pain in abdomen, fever and alcoholism

For laboratory diagnosis of megaloblastic anemia complete blood picture with PBS showed macrocytosis, hypersegmented neutrophil, raised MCV and RDW, assay of two vitamins (vit B12 and folic acid) and bone marrow aspiration required for definitive diagnosis.[16,17,18]

The severity of megaloblastic marocytosis is directly proportional to the severity of the anaemia and early megaloblastosis may manifest only mild change. Six lobed neutrophil may be absent and increased in four lobed and five lobed neutrophil may be evident or presence of one seven loabed neutrophil or two six lobed neutrophil or three five lobed neutrophil strongly suggest megaloblastic anemia. [12] Anisocytosis and poikilocytosis is higher in megaloblastic anemia. [16,19] We observed anisopoikilocytosis in most of cases in present study.

In our study27% cases showed megaloblastic anemia On PBS showed macrocytes, macrovalocyte, occasional or one-two hypersegmented neutrophil or hypersegmented neutrophil not be seen in few cases, increased MCV, between 110-131fl, on haematology automated analyzer and presence of megaloblast in bone marrow aspiration.

The finding of MCV of more than 100cu microns quite helpful due to limited differential diagnosis. An MCV of more than 120cu microns almost always indicate megaloblastic anemia. If there is any doubt as to cause of macrocytic anemia, a bone marrow aspirate and biopsy should be done, in classic megaloblastic anemia one will see increased cellularity in the biopsy specimen. The aspirate will show erythroid hyperplasia, delayed nuclear maturation relative to haemoglobinization of the cytoplasm seen best in basophilic, polychrmatophilic and orthochromatophilic erythroblast.[12]One author stated only minority of patient with MCV level above 100fl are deficient in vitB12 or folate. [,20]

Moreover serum cobalamine levels may not be indicative of actual deficiency. Cobalamine levels may be falsely high in patient with megaloblastosis due to nitrous oxide,transcobalamine II deficiency.Vitamin B12 level may be significantly lower imMegaloblastic anemia[21]]

Only minority of patient with MCV level above 100fl are deficient with vitamin B12 or folate.[20]Patient with nonmegaloblastic macrocytic anemia haveMCV less than 120cu microns. Alcohol ingestion is commonest cause of mild macrocytosis. Other causes of macrocytosis are liver diseases, severe hypothyroidism and chemotherapy induced [12]

In this study there are 9.18% cases with macrocytosis, in this case showed normal vit B12 and decreased or normal folic acid level

Conclusion

Result of this study demonstrates large number of iron deficiency anaemia cases seen in female with reproductive age group. In megaloblasticanaemia more number of cases are seen in age group between 50-60 years in both sex. For the diagnosis of microcytic hypochromic anemia haemogram by automated hematologyanalyzer, PBS examinationserum iron profile is necessary for correct diagnosis and for macrocytic anemia haemogram,PBS examination, bone Marrow aspiration cytology and assay of two vitamins like B12 and folic acid and reticulocyte are needed for diagnosis. Serum iron profile, vit B12, folic acid and bone marrow aspiration should be done in addition of PBS examination for correct diagnosis and treatment of nutritional anemia.

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