

Clinicohematological evaluation of anaemia in females of reproductive age group (15-49 years)

¹Dr. Anil Kumar Sharma, ²Dr. Bharti Thaker, ³Dr. Ameet Kaur, ⁴Dr. Deepa Hans

¹Postgraduate, Department of Pathology, GMC Jammu, Jammu and Kashmir, India

²Associate Professor, Department of Pathology, GMC Jammu, Jammu and Kashmir, India (Corresponding author)

³Associate Professor, Department of Pathology, GMC Jammu, Jammu and Kashmir, India

⁴Associate Professor, Department of Pathology, GMC Jammu, Jammu and Kashmir, India

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Abstract:

Introduction: Anaemia is one of the most common nutritional disorders. It has a great public health importance in developing countries like India where it is the most widespread nutritional problem. The present study assessed the clinicohematological evaluation of anaemia in females of reproductive age group (15-49 years). **Objective:** Clinicohematological evaluation of anaemia in females of reproductive age group (15-49 years) including various morphological patterns of anaemia. **Materials and method:** The study was conducted in the Postgraduate Department of Pathology, Government Medical College, Jammu prospectively for a period of one year w.e.f 1st November 2021 to 31st October 2022. The study included women in reproductive age group (15-49 years) referred to this department from all clinical departments of Government Medical College Jammu and associated hospitals. The study material which included peripheral blood films, bone marrow aspirates and bone marrow biopsies from these patients was subjected to Leishman, MGG and H&E staining. The results of clinical findings, general physical examination, relevant investigations were recorded and detailed microscopic examination of peripheral blood smears and bone marrow aspiration/biopsy was performed. **Results:** Common presenting complaints were generalised weakness (60%), fever (26.15%), easy fatigability (20%), menorrhagia/bleeding manifestations (6.15%) and abdominal pain (7.69%). Majority (96.92%) had moderate to severe anaemia. Peripheral blood film examination showed Dimorphic picture in 33.84% patients, Macrocytic Hypochromic picture in 41.54%, Microcytic Hypochromic picture in 7.69% and Normocytic Hypochromic picture in 16.93% patients. Based on history, physical and clinical evaluation, PBF and Bone marrow findings in 65 patients in our study group, final diagnosis Megaloblastic anaemia was given in 31 (47.69%) patients, Dual deficiency anaemia in 12 (18.46%), Iron deficiency anaemia in 05 (7.69%), Acute leukaemia in 07 (10.76%), Aplastic anaemia in 02 (3.08%), Chronic myeloid leukaemia in 02 (3.08%), Multiple Myeloma in 02 (3.08%), Essential Thrombocythemia in 02 (3.08%), Juvenile Myelomonocytic Leukaemia in 01 (1.54%) and Idiopathic Thrombocytopenic Purpura in 01 (1.54%) case. **Conclusion:** Nutritional anaemias were found to be the most common cause of anaemia in our study accounting for 73.84% of cases with adolescent females most commonly affected. Females particularly in reproductive age group are more prone to anaemia which can be because of growth spurt, menstrual irregularities, faulty dietary habits, insufficient dietary intake and parasitic infections. Food fortification and diversification including Iron/B12/Folate supplementation and improvement in personal hygiene should be promoted among females particularly in women of reproductive age group to overcome the problem of anaemia.

Introduction:

Anaemia is one of the most common nutritional disorders. It has a great public health importance in developing countries like India where it is the most

widespread nutritional problem. WHO (2019) has estimated that prevalence of anaemia in females of reproductive age group (15-49 years) is 29.9% in world and 53% in India. The economic and social consequences of anaemia are enormous including a

significant drain on health care, education resources, labour productivity, reduced physical and mental capacity of large segments of the population. The epidemiology and aetiology of anaemia are multifactorial including inadequate nutrition, chronic diseases, renal diseases, leukaemia, inherited disorders like thalassemia etc.

WHO (1968) proposed that "Anaemia or deficiency should be considered to exist" when haemoglobin is below the following levels.

Cut-Off points for the diagnosis of Anaemia

Hb(g/dl, venous blood) MCHC (per cent)

Adult males	13	34
Adult females, non- pregnant	12	34
Adult females, pregnant	11	34
Children, 6 months to 6 years	11	34
Children, 6 to 14 years	12	34

We have taken women of reproductive age group in our study because in India according to National Family Health Survey -4, 53% of females in reproductive age group are anaemic. Anaemia has both immediate and long-term consequences. Anaemia in adolescent girls leads to decreased secondary growth rate, lack of concentration and decreased school performance. Anaemia in pregnant females leads to increased risk of low-birth-weight babies and increase in infant mortality rate. Anaemia in pregnant females especially iron-deficiency anaemia, can lead to not only adverse birth outcomes but also poorer cognitive development in infancy and early childhood.

Objective:

Clinicohematological evaluation of anaemia in females of reproductive age group (15-49 years) including various morphological patterns of anaemia.

Materials and method:

The study was conducted in the Postgraduate Department of Pathology, Government Medical

College, Jammu prospectively for a period of one year w.e.f 1st November 2021 to 31st October 2022.

The study included women in reproductive age group (15 years to 49 years) referred to this department from all clinical departments of Government Medical College Jammu and associated hospitals for evaluation of anaemia. Detailed history, clinical examination, investigations like ESR, Serum iron/ferritin/B12/folate levels and reticulocyte count were recorded. The study material which included peripheral blood films, bone marrow aspirates and bone marrow biopsies from these patients was subjected to Leishman, MGG and H&E staining followed by detailed microscopic examination. The results of clinical findings, general physical examination, relevant investigations were recorded and detailed microscopic examination of peripheral blood smears and bone marrow aspiration/biopsy was performed.

Exclusion criteria:

- Aspirates and trephine biopsies with inadequate material
- Patients with coagulopathies
- Patients allergic to Xylocaine
- Non-Cooperative patients

Results:

In our study we observed that majority of females with anaemia are at younger age group (15-24 years, 49.23%) followed by 26.15% in 25-34 year age group and 24.62% in 35-49 year age group. Common presenting complaints were generalised weakness (60%), fever (26.15%), easy fatigability (20%), menorrhagia/bleeding manifestations (6.15%) and abdominal pain (7.69%). Majority of our patients (96.92%) had moderate to severe anaemia. Peripheral blood film examination showed Dimorphic picture in 33.84% patients, Macrocytic Hypochromic picture in 41.54%, Microcytic Hypochromic picture in 7.69% and Normocytic Hypochromic picture in 16.93% patients. Nutritional anaemias were found to be the most common cause of anaemia in our study accounting for 73.84% of cases. Pancytopenia was seen in 16 out of 65 patients out of which 11 were later on diagnosed as megaloblastic anaemia, 01 as

acute leukemia, 02 as aplastic anaemia, 01 as dual deficiency anaemia and 01 as Iron deficiency anaemia based on PBF, Bone marrow findings and other necessary investigations like Flowcytometry, Serum Iron/Folate/B12 levels etc. Peripheral Blood Film examination showed atypical cells/blasts in 10.76% cases. Bone marrow examination was done and presumptive diagnosis of Acute Leukaemia

was made which was later confirmed and categorised based on Flowcytometry findings. 02 patients presented with platelet counts >6.5 lakh/cumm and were diagnosed with Essential Thrombocythemia based on peripheral blood film examination and bone marrow findings and later confirmed by JAK2 mutation studies.

TABLE 1: -DISTRIBUTION OF AGE(YEARS) OF STUDY SUBJECTS.

Age(years)	Frequency	Percentage
15-24 years	32	49.23%
25-34 years	17	26.15%
35-49 years	16	24.62%
Total	65	100.00%

TABLE 2: -DISTRIBUTION OF PRESENTING SYMPTOMS AND SIGNS AMONG STUDY SUBJECTS.

Complaints	Frequency	Percentage
Generalized weakness	39	60.00%
Easy fatigability	13	20.00%
Shortness of breath	8	12.30%
Fever	17	26.15%
Pain abdomen	5	7.69%
Petechiae/Gum bleeds/Menorrhagia	4	6.15%
Other symptoms (abdominal distension, vomiting, bone pain)	4	6.15%
Pallor	65	100%
Hepatomegaly	7	10.76%
Splenomegaly	23	35.88%

TABLE 3: -DISTRIBUTION OF DEGREE OF ANEMIA OF STUDY SUBJECTS.

Degree of anemia	Frequency	Percentage
Mild anemia{> 10 g/dL}	2	3.08%
Moderate anemia{7 to 9.9 g/dL}	20	30.76%

Severe anemia{ <7 g/dL }	43	66.16%
Total	65	100.00%

TABLE 4: -PBF FINDINGS

Type of anemia	Frequency	Percentage
Predominantly Microcytic Picture	5	7.69%
Predominantly Macrocytic Picture	27	41.54%
Dimorphic picture	22	33.84%
Normocytic picture	11	16.93%
Pancytopenia	16	24.61%
Atypical cells/Blasts	07	10.76%
RBC Inclusions (Cabot rings, Howell jolly bodies, basophilic stippling etc)	05	07.69%
Haemoparasites	02	3.08%

TABLE 5: -SPECTRUM OF BONE MARROW FINDINGS USING BONE MARROW ASPIRATION AND/OR BIOPSY

Bone marrow aspiration findings	Bone marrow trephine biopsy findings	No. of patients	%age	Diagnosis
Erythroid hyperplasia with megaloblastic erythropoiesis with increased iron stores. M:E Ratio reduced. Megakaryocytes decreased but functional.		31	47.69	Megaloblastic anemia
Erythroid hyperplasia with megaloblastic change with decreased iron stores. M:E Ratio reduced		12	18.46	Dual deficiency anemia
Hypercellular marrow with increased blasts (>20%)		07	10.76	Acute leukemia
Normoblastic erythropoiesis with decreased iron stores		05	7.69	Iron deficiency anemia
Markedly diminished	Increased fat spaces and	02	3.08	Aplastic anemia

cellularity and increased fat spaces	reduced cellularity with predominance of lymphocytes, few plasma cells and mast cells.			
Suppression of myeloid and erythroid series and replacement of normal marrow by plasma cells	Cellular marrow with plasma cell clusters infiltrating marrow	02	3.08	Multiple myeloma
Hypercellular marrow showing marked myeloid hyperplasia with myeloid series showing full range of maturation. Blasts<5% Myelocyte 30-40%, Basophils 5-10%		02	3.08	CML
Marked megakaryocytic hyperplasia with giant megakaryocytes seen in loose clusters		02	3.08	Essential Thrombocythemia
Hypercellular marrow with myeloid hyperplasia and dysgranulopoiesis.		01	1.54	JMML Adult type
Megakaryocytic hyperplasia with increased number of promegakaryocytes		01	1.54	Megakaryocytic Hyperplasia, to rule out ITP.

PHOTOMICROGRAPHS



FIG. 1- PHOTOMICROGRAPH SHOWING MACROOVALOCYTES, MICROCYTES AND TEAR DROP CELLS IN PERIPHERAL BLOOD FILM (MGG 100X).

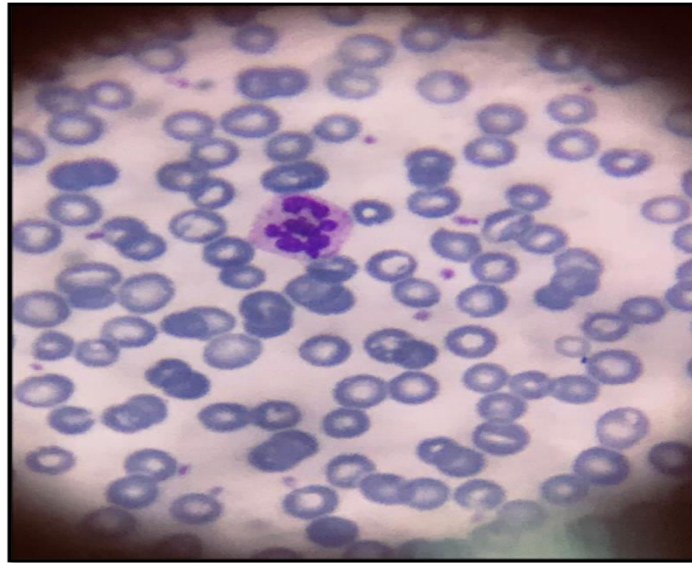


FIG.2 - PHOTOMICROGRAPH SHOWING HYPERSEGMENTED NEUTROPHIL IN PBF (MGG 100X).

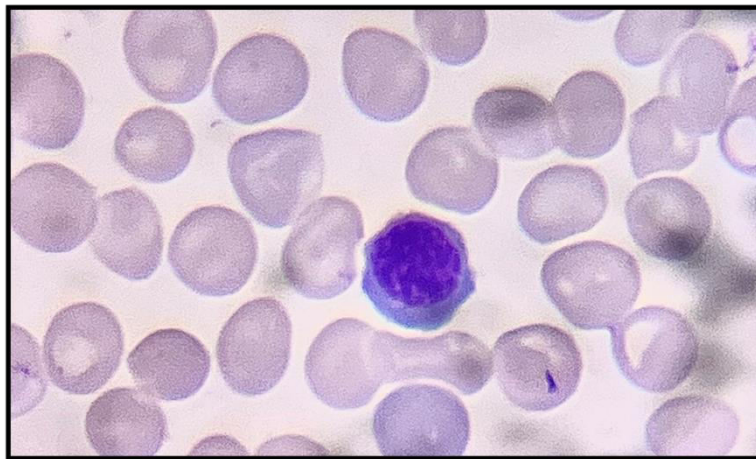


FIG. 3a- PHOTOMICROGRAPH SHOWING CIRCULATING MEGALOBLAST IN PERIPHERAL BLOOD FILM (MGG 100X).

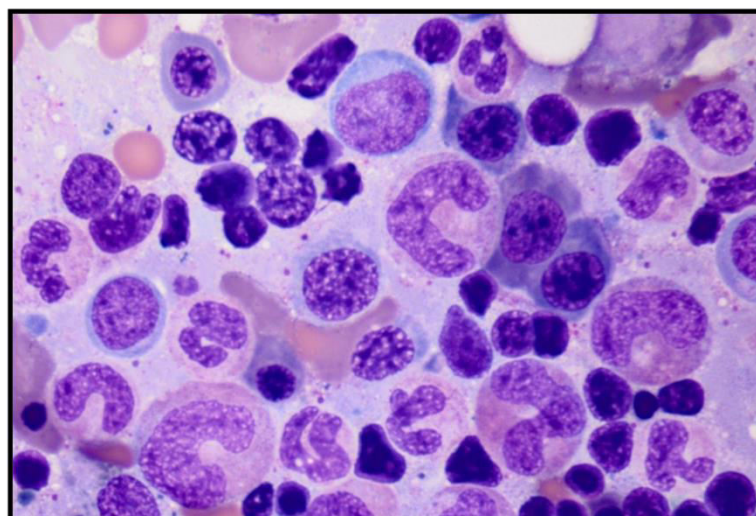


FIG. 3b - PHOTOMICROGRAPH SHOWING BONE MARROW ASPIRATION SMEAR IN A CASE OF MEGALOBlastic ANEMIA (MGG 100X).

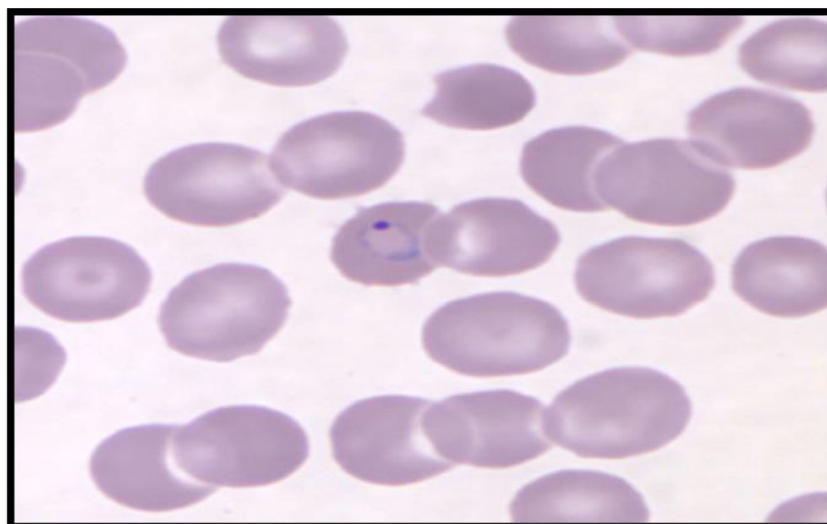


FIG. 4 - PHOTOMICROGRAPH SHOWING RING FORM OF PLASMODIUM VIVAX IN PERIPHERAL BLOODL FILM (LEISHAMAN'S,100X)

Discussion:

This study was done to evaluate all the females in reproductive age group clinically and haematologically and to study the various morphological patterns and causes of anaemia which would aid in the diagnosis and identification of various risk factors. In our study we observed the importance of detailed clinical examination combined with complete blood counts followed by bone marrow examination which would help us in the diagnosis of anaemia and to find the underlying cause of anaemia.

In our study we observed that majority of females with anaemia were at younger age group (15-24 years, 49.23%) with lesser number of cases in older age group (35-49 years age, 26.42%). This could be because of growth spurt in adolescent age, menstrual irregularities and insufficient dietary intake. **Choudhary R et al., (2020)** also found in their study the higher prevalence of anaemia in the women of reproductive age group, particularly in adolescent age group.

In our study, most of the patients (60%) patients presented with generalised weakness, 13(20%) with easy fatigability and 17(26.15%) with fever. This is because of the decreased oxygen carrying capacity of blood because of low haemoglobin levels. Pallor was seen in all the cases in our study.

Munde HS et al., (2021) in their study of clinico-hematological evaluation in cases of pancytopenia

also observed that the majority of patients presented with generalised weakness and fever. **Vaidya S (2015)** in her study of evaluation of bone marrow in cases of pancytopenia also found that the chief presenting complaints were generalised weakness, fever and bleeding manifestations. **Vaidya S (2015)** and **Munde HS et al., (2021)** observed that pallor was present in 100% and 94% cases in their respective studies.

In present study, 3.08% (02) had mild anaemia and 96.92% (63) had moderate to severe anaemia. Majority of patients in our study had moderate to severe degree of anaemia. This could be because most of the patients belonged to rural areas and were referred to our centre in later stages.

Ramya G et al., (2016) in their analytical study of morphological patterns of anaemia and associated illnesses in females found that 18% had mild anaemia and 82% had moderate to severe anaemia.

Panyang R et al., (2018) in their study of prevalence of anaemia among the women of childbearing age observed that almost 100% females had moderate to severe anaemia.

In our study on the basis of PBF findings, provisional diagnosis of macrocytic hypochromic anaemia was made in 41.54% (27) patients, dimorphic anaemia in 33.84% (22) patients, normocytic normochromic anaemia in 16.93% (11) patients and microcytic hypochromic anaemia in 7.69% (5) patients, Vitamin B12 and folate

deficiency was found to be more common because of pure vegetarian diet in these patients and increased requirement in adolescent, pregnancy and during lactation.

Choudhary R *et al.*, (2020) in their study of morphological pattern of anaemia found that out of 302 females, 210 (69.53%) had microcytic anaemia, 57 (18.87%) had normocytic anaemia and 35 (11.58%) had macrocytic anaemia.

Abusharib AB (2019) in his study of morphological pattern of anaemia among pregnant females found that 58% had dimorphic anaemia, 10% had macrocytic anaemia and 07% had normocytic anaemia.

Out of 65 patients evaluated for anaemia in our study group, final diagnosis of Megaloblastic anaemia was given in 31 (47.69%) followed by Dual deficiency anaemia (18.46%), Iron deficiency anaemia (7.69%) with Acute leukaemia (10.76%) and Myeloma (3.08%) cases in least number.

Makheja KD *et al.*, (2013) in their study of causes of pancytopenia found that 42.3% had Megaloblastic anaemia, 26.9% had acute leukaemia and 05 (19.2%) had aplastic anaemia.

Dubey TN *et al.*, (2016) in their study of causes leading to pancytopenia observed that 48.3% had Megaloblastic anemia, 10.3% had aplastic anaemia, 13.8% had acute leukaemia and 3.4% had Myeloproliferative disorder.

Dasgupta S *et al.*, (2015) in their study of aetiology of pancytopenia found out that out of 92 females included in their study with mean age of 33 years, 24 (46.15%) had Megaloblastic anaemia and 14 (16.87%) had aplastic anaemia.

Conclusion:

Females particularly in reproductive age group are more prone to anaemia which can be because of growth spurt, menstrual irregularities, faulty dietary habits, insufficient dietary intake and parasitic infections. Pregnancy is associated with increased demands of macro and micronutrients in diet and such females are also at more risk of developing anaemia. Social and cultural norms also play a role in such patients. Pure vegetarian diet, fad diets, poor socioeconomic and literacy status are also

important risk factors in the development of anaemia. In present study, nutritional deficiency was the most important cause of anaemia. Food fortification and diversification including Iron/B12/Folate supplementation and improvement in personal hygiene should be promoted among females particularly in women of reproductive age group. Early diagnosis of anaemia should be made and its cause should be found out so that the clinician can start appropriate treatment as soon as possible to have healthy young adolescent female population.

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