

## Unraveling the Complexity of Anemia in the Elderly: Insights from A Cross-Sectional Study At SLN Medical College And Hospital, Koraput, Odisha, India

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### Abstract:

**Background:** Anemia, characterized by reduced hemoglobin (Hb) or hematocrit levels below the lower limit of the 95% reference interval adjusted for age, sex, and geographic location, presents a significant health concern among the elderly. Understanding its etiology, clinical manifestations, and regional variations is crucial for effective management.

**Methodology:** A cross-sectional study was conducted at SLN Medical College and Hospital, Koraput, Odisha, India, involving 100 consecutive anemic patients aged 60 years and above. Data collection included comprehensive history-taking, clinical examination, and hematological investigations, alongside additional diagnostic procedures.

**Results:** The study revealed a gender-balanced distribution among participants, with fatigue being the predominant symptom, followed by palpitations and anorexia. Clinical signs such as pallor and pedal edema were prevalent. Normocytic normochromic anemia was the most common type, with nutritional deficiencies and blood loss being the primary etiological factors identified.

**Discussion:** Anemia in the elderly is multifactorial, with anemia of chronic disease and iron deficiency being notable contributors. The study highlights the importance of tailored diagnostic approaches and caution against indiscriminate hematinic use. Regional variations in etiological patterns underscore the need for context-specific management strategies.

**Conclusion:** Our study underscores the complexity of anemia in the elderly, emphasizing the necessity for individualized care approaches tailored to address diverse etiological and clinical aspects. Through continued research and clinical vigilance, we aim to enhance outcomes and quality of life for elderly individuals affected by anemia.

**Keywords:** Anemia, Elderly, Etiology, Clinical Manifestations, Management.

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### Introduction

Anemia, derived from the French words "an" (not) and "haem" (blood), is diagnosed when the concentration of hemoglobin (Hb) or hematocrit falls below the lower limit of the 95% reference interval adjusted for an individual's age, sex, and geographic location [1].

According to the World Health Organization (WHO) [2], anemia is defined in adults by Hb levels below 13 g/dl for males and 12 g/dl for females. While various measures such as hemoglobin, hematocrit, or red cell count can

establish anemia, hemoglobin concentration is often preferred due to its direct correlation with the pathophysiologic consequences of anemia.

The prevalence of anemia varies with age, sex, and geographical factors. For instance, the normal range for red cell count, hemoglobin, and packed cell volume (PCV) differs between males and females. Anemia, rather than a disease in itself, serves as a crucial indicator of underlying pathologies. Its detection, whether as a primary condition or complicating another illness, prompts

medical attention, necessitating precise diagnostic terminology inclusive of the underlying cause for appropriate treatment.

Anemia poses a significant concern in the geriatric population, where its complications can be more severe and profoundly impact quality of life compared to younger adults [3]. Hence, understanding the clinical profile, types, and etiologies of anemia in this demographic is paramount.

The objectives of this study are as follows:

1. To investigate the clinical profile of anemia in the geriatric population.
2. To identify various types of anemia and correlate them with clinical presentations.
3. To ascertain the etiologies of anemia, with particular focus on a semiurban geriatric population, thereby contributing to a comprehensive understanding of this condition in this demographic.

### Materials and Methods

**Study Setting:** The study was conducted at SLN Medical College and Hospital, Koraput, Odisha, India.

**Study Design and Participants:** This observational cross-sectional study enrolled a consecutive cohort of 100 anemic patients aged 60 years and above of either sex who presented to our hospital. Anemia was defined based on the World Health Organization (WHO) criteria, with hemoglobin levels below 13 g/dl in males and below 12 g/dl in females.

**Data Collection:** A comprehensive history was obtained from each participant regarding the nature and duration of symptoms. A detailed clinical examination was conducted, focusing on symptoms such as easy fatigability, lassitude, breathlessness, palpitations, chest pain, swelling of feet/anasarca, rashes, petechiae, purpura, bone pain, joint pain, leg ulcers, fever, paraesthesia, difficulty in walking, unsteadiness, and history of melena as well as hematemesis. General examination included the assessment of pallor in the conjunctiva and oral mucosa, as well as features such as atrophy of filiform papillae of the tongue, cheilosis, platynychia, koilonychia of the nails, and knuckle pigmentation.

Pedal edema and signs of cardiac failure were noted. Systemic examination encompassed cardiovascular findings including hemic murmurs and venous hum, abdominal findings of hepatomegaly, splenomegaly, and ascites, and assessment for respiratory infections and neurological dysfunction, particularly dorsal

column sensory loss in suspected cases of megaloblastic anemia. Fundoscopy was performed to detect optic atrophy.

**Hematological Investigations:** The following hematological investigations were conducted for all patients:

1. Hemoglobin (Hb), Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin Concentration (MCHC), Mean Corpuscular Hemoglobin (MCH), packed cell volume (PCV), reticulocyte count, and peripheral smear examination for red blood cell (RBC) morphology, premature cells, blast cells, and malarial parasites.
2. Total leukocyte count (TLC) and differential leukocyte count (DLC).
3. Erythrocyte Sedimentation Rate (ESR).
4. Platelet count.
5. Serum lactate dehydrogenase (LDH).
6. Hemoglobin electrophoresis in selected patients.
7. Blood urea, serum creatinine, and serum ferritin when indicated.
8. Bone marrow studies (aspiration/biopsy) for patients with abnormal blood smear showing immature white cells or nucleated red cells.
9. Vitamin B12 and folate assays for patients with dimorphic and macrocytic anemia.

### Additional Investigations:

Patients underwent the following additional investigations:

1. Chest X-ray.
2. Electrocardiogram (ECG).
3. Ultrasonography (USG) of the abdomen and pelvis.
4. Stool examination for parasites and occult blood.
5. Computed tomography (CT) or magnetic resonance imaging (MRI) for suspected malignancy cases.
6. Upper gastrointestinal (GI) endoscopy for patients with upper GI bleeding.

Patients were further evaluated for underlying malignancy based on clinical symptoms, laboratory parameters, or imaging studies if suspicion arose.

### Results

Table 1 illustrates the distribution of patients according to age and gender. The majority of patients belonged to the age group of 61-65 years, with 40% males and 22% females, followed by the age group of 66-70 years, accounting for 32% males and 18% females. Overall, the gender distribution among the study participants was fairly balanced.

**Table 1: Age and Gender distribution**

AGE (in Years)	Male	Female	Total	Percentage
61- 65	18	22	40	40 %
66-70	14	18	32	32 %
71 – 75	8	6	14	14 %
76 - 80	4	5	9	9 %
81 – 85	1	3	4	4 %
86 or more	0	1	1	1 %
TOTAL	45	55	100	100 %

Table 2 presents the various presenting symptoms observed in the study cohort. Fatigue was the most common symptom reported by 70% of patients, followed by palpitations and anorexia, each reported by 11% of patients. Breathlessness on exertion and other symptoms were less frequently reported.

**Table 2: Presenting Symptoms**

Symptom	No. of Patients	Percentage
Fatigue	70	70 %
Palpitations	11	11 %
Anorexia	11	11 %
Breathless on Exertion	5	5 %
Others	3	3 %

Table 3 outlines the clinical signs observed in the study population. Pallor was the most prevalent sign, noted in 66 patients, followed by pedal edema in 20 patients. Glossitis, lymphadenopathy, congestive heart failure (CHF), and hepatosplenomegaly were observed in a smaller proportion of patients.

**Table 3: Signs**

Signs	No. of Patients
Pallor	66
Pedal edema	20
Glossitis	6
Lymphadenopathy	2
CHF	8
Hepatosplenomegaly	2

Table 4 further elaborates on bone marrow findings in the study cohort. Iron deficiency was noted in 4 patients, while aplastic and hypercellular bone marrow was observed in 1 and 2 patients, respectively. Dimorphic and megaloblastic bone marrow patterns were seen in 4 patients each, while chronic leukemia was diagnosed in 2 patients.

**Table 4: Types of Anemia**

PBS Findings	No. of Patients
Normocytic	62
Microcytic	28
Dimorphic	2
Megaloblastic	6
Pancytopenia	2

Table 5 summarizes the etiology of anemia categorized by gender. Blood loss and nutritional deficiencies were the most common causes in both males and females. Chronic leukemia, upper gastrointestinal malignancies, chronic renal failure, liver disease, tuberculosis, aplastic anemia, and hemolytic anemia were among the other identified causes, with varying frequencies among males and females.

**Table 5:**

Bone Marrow Findings	No. of Patients
Iron Deficiency	4
Aplastic	1
Dimorphic	4
Hypercellular	2
Megaloblastic	4
Chronic Leukemia	2

Overall, the etiological distribution of anemia differed slightly between genders, with certain causes being more prevalent in one group than the other.

**Table 6: Aetiology of Anemia**

<b>Aetiology</b>	<b>Male</b>	<b>Female</b>
Blood Loss	12	18
Nutritional	14	22
Chronic Leukemia	1	1
Upper GI Malignancies	1	0
Chronic Renal Failure	5	6
Liver Disease	7	2
Tuberculosis	2	3
Aplastic Anemia	2	2
Hemolytic Anemia	1	0
Total	45	55

## Discussion

Anemia in the elderly population presents a multi-faceted clinical challenge, with various underlying etiologies contributing to its prevalence. Among these, anemia of chronic disease stands out as a significant cause globally [6]. In our study, we observed a substantial proportion of iron deficiency anemia, often stemming from chronic gastrointestinal bleeding [5].

Additionally, deficiencies in vitamin B12, folate, and myelodysplastic syndromes (MDS) emerged as notable contributors to anemia in the elderly [7]. The aging process itself impacts blood production, characterized by a reduced ratio of bone marrow to fat cells and diminished marrow response to erythropoietin stimulation [8]. However, it is crucial to discern that the decline in hemoglobin levels and the subsequent increase in anemia prevalence with age should not be automatically attributed to "normal aging" or nutritional deficiencies. Therefore, the indiscriminate administration of hematinics warrants caution, and the detection of anemia in older individuals should prompt thorough clinical evaluation and tailored management strategies.

Our study population demonstrated a gender distribution comparable to findings from previous research conducted in South India [9], with a slight female predominance. Consistent with existing literature, fatigue emerged as the most prevalent symptom in our cohort, underscoring its significance as a common manifestation of anemia [9]. Palpitations and anorexia were reported in a substantial proportion of patients, aligning with observations from similar studies [9]. Notably, dyspnea on presentation was observed in a smaller percentage of patients, a finding consistent with prior research [9]. While cardiovascular symptoms have been highlighted in some studies [11], the diverse symptomatology associated with anemia underscores the need for comprehensive evaluation before attributing symptoms solely to the underlying condition. Thus, correction of hemoglobin levels is imperative to discern the true significance of these symptoms in relation to potentially more serious

underlying illnesses.

In terms of etiology, nutritional deficiencies emerged as the leading cause in our study, followed closely by blood loss [9]. These findings align with observations from previous research [9]. Conversely, in Western countries, anemia of chronic disease, particularly in the context of chronic kidney disease (CKD), is more prevalent [12]. In our study, we detected a notable number of CKD cases, highlighting the importance of considering regional variations in etiological patterns.

Normocytic normochromic anemia predominated in our study, consistent with previous findings [9]. This underscores the importance of evaluating the underlying etiology comprehensively, as the etiological landscape of anemia can vary widely across populations. While normocytic anemia was prevalent, microcytic and macrocytic patterns were also observed, emphasizing the diverse hematological manifestations of anemia in the elderly [9].

In conclusion, our study contributes to the understanding of anemia in the elderly, highlighting the complex interplay of various etiological factors and emphasizing the need for tailored diagnostic and therapeutic approaches in this vulnerable population.

## Conclusion

Our study sheds light on the intricate landscape of anemia in the elderly, uncovering a diverse array of contributing factors and clinical presentations. Anemia of chronic disease, iron deficiency, and deficiencies in vitamin B12 and folate emerged as prominent etiologies, reflecting the complex interplay of physiological changes and underlying pathologies in aging individuals. Importantly, our findings underscore the necessity of vigilant clinical evaluation and tailored management strategies when confronting anemia in older patients, cautioning against the indiscriminate use of hematinics without thorough investigation. In conclusion, our study contributes valuable insights into the understanding and management of anemia in the elderly, emphasizing the importance of individualized care

approaches tailored to address the multifaceted etiological and clinical nuances of this condition in aging populations. Through continued research and clinical vigilance, we strive to improve outcomes and quality of life for elderly individuals grappling with anemia.

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