

Prevalence and Morphological Patterns of Anemia among Hospitalized Geriatric Patients in a Tertiary Hospital of Bangladesh

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Abstract

Introduction: Anemia is a common yet often underrecognized health problem among older adults, particularly in hospitalized populations where chronic illnesses and nutritional deficiencies are highly prevalent. Its presence in geriatric patients is associated with functional decline. This study aims to assess the prevalence and morphological patterns of anemia among hospitalized geriatric patients in a tertiary hospital in Bangladesh.

Methods: This descriptive cross-sectional study was conducted in the Department of Medicine at Sylhet MAG Osmani Medical College, Sylhet, Bangladesh, from March to August 2017. A total of 384 patients were selected as study subjects. Data were analyzed using SPSS version 16.

Result: Among 384 geriatric patients, 172 (44.7%) were anemic. Normocytic anemia was the most common type (59.9%), followed by microcytic (30.8%) and macrocytic anemia (9.3%). Peripheral smear findings similarly showed predominance of normocytic anemia with smaller proportions of microcytic, macrocytic, and chronic disease-related patterns. Iron profile and vitamin B12 assessment in a subset of patients revealed low serum iron, low transferrin saturation, elevated TIBC, and low ferritin, along with borderline vitamin B12 levels, suggesting primarily iron deficiency with some mixed nutritional anemia.

Conclusion: It can be concluded that nearly half of the geriatric patients admitted to the hospital are anaemic, with normocytic normochromic anaemia being the predominant followed by microcytic and macrocytic.

Keywords: Anemia, Geriatric Patients, Normocyte

I. INTRODUCTION

Anemia is a highly prevalent yet frequently overlooked clinical condition among older adults, particularly in low- and middle-income countries where the burden of chronic disease, nutritional deficiencies, and healthcare disparities is substantial. The World Health Organization (WHO) has recently reaffirmed population-based haemoglobin thresholds for diagnosing anemia and emphasized its significant impact on functional status and health outcomes across all age groups, including the elderly [1]. Age-related physiological changes, multimorbidity, and polypharmacy place geriatric patients at heightened risk of developing anemia, which is strongly linked to frailty, cognitive impairment, reduced exercise capacity, diminished quality of life, prolonged hospitalization, and increased mortality [2]. Globally, anemia prevalence increases progressively with age. Population-based studies indicate that between 10% and 20% of community-dwelling older adults are anemic, while hospital-based studies often report much higher prevalence due to the concentration of individuals with multiple comorbidities [3–5]. In a large outpatient elderly cohort in Ethiopia, Melku et al. demonstrated a substantial burden of anemia even among ambulatory geriatric patients, highlighting the need for systematic evaluation in healthcare settings serving older populations [4]. Hospitalized elderly patients, in particular, show a higher prevalence and greater severity of anemia due to underlying inflammatory, neoplastic, renal, and nutritional disorders. Studies from Europe and Asia have consistently confirmed this pattern, with anemia present

in up to 60% of admitted geriatric patients in some settings [5–7]. The etiological spectrum of anemia in older adults is broad. Iron deficiency—stemming from chronic gastrointestinal blood loss, inadequate intake, or malabsorption—remains a major cause worldwide, especially in South Asian countries. Anaemia of chronic inflammation is also common among elderly individuals with infections, chronic kidney disease, malignancy, or autoimmune disorders. Other contributors include vitamin B12 and folate deficiencies, endocrine disorders, and bone marrow pathologies such as myelodysplastic syndromes [2,8]. However, even after thorough evaluation, a significant proportion of elderly patients have unexplained anemia, underscoring the complexity of its pathophysiology and the need for improved diagnostic approaches [3]. Morphological classification of anemia into microcytic, normocytic, and macrocytic types remains a practical and cost-effective first step for evaluation in resource-limited settings. Normocytic normochromic anemia is often reported as the most common type among hospitalized elderly patients, reflecting chronic disease and mixed etiologies [5,6]. Microcytic anemia frequently indicates iron deficiency or thalassemia traits, while macrocytosis may suggest vitamin B12/folate deficiency, liver disease, alcohol use, or marrow disorders [8,9]. These morphological patterns can guide clinicians in prioritizing targeted diagnostic investigations, particularly in low-resource tertiary care hospitals where advanced testing may not be readily available. In Bangladesh, where anemia remains a major public health issue across all age groups, evidence suggests that prevalence among the elderly is notably high. Biomarker-based studies of older Bangladeshis have reported substantial rates of low hemoglobin and depleted iron stores [10]. This study aims to assess the prevalence and morphological patterns of anemia among hospitalized geriatric patients in a tertiary hospital in Bangladesh.

II. METHODS

This descriptive cross-sectional study was conducted in the Department of Medicine at Sylhet MAG Osmani Medical College, a tertiary care teaching hospital in Sylhet, Bangladesh, over six months from March to August 2017. A total of 384 patients aged 60 years or older, admitted during the study period, were included as the study sample. Eligible participants were those >60 years who provided informed written consent, while patients unwilling to participate or presenting with acute bleeding manifestations were excluded. A consecutive sampling technique was employed, whereby all admitted older adults meeting the inclusion and exclusion criteria and consenting to take part were enrolled. Data were collected using a structured checklist and analyzed using SPSS version 16. Descriptive statistics summarized baseline characteristics and anemia patterns, and associations between categorical variables were assessed using the Chi-square (χ^2) test, with a p-value <0.05 considered statistically significant.

III. RESULTS

Table 1: Distribution of patients by their demographic features (n=384)

Demographic characteristics	Frequency	Percentage	Mean \pm SD (range)
Age (years)			67.8 \pm 8.1(60-102)
60-70	224	58.3	
70-80	108	28.1	
\geq 80	52	13.5	
Sex			
Male	183	47.7	--
Female	201	52.3	--

Age distribution of the patients shows that 58.3% were 60-70 years old, 28.1% 70-80 years old, and 13.5% 80 or > 80 years old. The mean age of the patients was 67.8 \pm 8.1 years, and the lowest and the highest ages were 60 and 102 years, respectively. Over half (52.3%) of the patients were female, and the rest were male. [Table 1]

Table 2: Distribution of patients by their BMI(n=384)

BMI*(kg/m ²)	Frequency	Percentage
<18.5 (Underweight)	93	24.2
18.5-25.0(Normal)	235	61.3
25.0-30.0 (Overweight)	42	10.9
30.0-40.0 (Obese)	14	3.6
*Mean BMI= (21.3 \pm 3.9) kg/m ² ; range=(13.3-34.7) kg/m ²		

About one-quarter (24.2%) of the patients were underweight, 61.3% were of normal BMI, 10.9% were overweight, and 3.6% were obese. [Table 2]

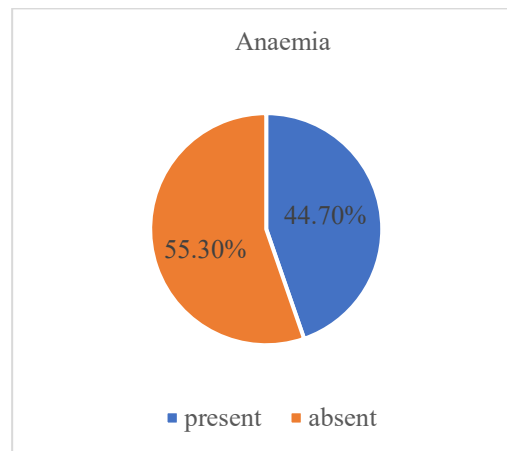


Fig. 1: Distribution of patients by presence of anaemia(n=384)

Out of 384 patients, 172 (44.7%) were anemic (level of hemoglobin < 12 g/dl in women and <13 gm/dl in men), and the rest had a normal level of hemoglobin (Fig. 1).

Table 3: Distribution of patients by types of anaemia (n=172)

Types of anemia	Frequency	Percentage
Normocytic	103	59.88
Microcytic hypochromic	53	30.81
Macrocytic	16	9.31

Based on peripheral blood examination, normocytic normochromic anaemia was observed to be predominant (55.9%), followed by microcytic hypochromic (24.5%), macrocytic hypochromic (6.9%), and anaemia of chronic diseases (6.4%). Another rare variety of anaemia was anisochromia anisocytosis. [Table 3]

Table 4: Distribution of patients by their Iron profile (n=172)

Iron profile & Vitamin B ₁₂	Median ± SEM	Range
S. Iron (ng/ml)	28.0 ± 7.6	2.7 - 215
TIBC (%)	305.0 ± 11.5	211- 540
S. Ferritin (ng/ml)	30.0 ± 3.5	4.77- 91.0
Transferrin saturation (%)	9.7 ± 3.3	2.77- 79
Vit B ₁₂ (pmol/L)	214.0 ± 36.8	50- 320

Some patients were subjected iron profile and vitamin B12 estimation. Distribution of different parameters of iron and vitamin B2, with median, standard error of mean (SEM), and range, is illustrated in the table. [Table 4]

IV. DISCUSSION

In the current study, the prevalence of anemia was 44.7% which is much higher than that reported recently by Batch et al (21.1%) in the largest ever study on anaemia in the elderly population in Austria. [11] A systematic review of 34 studies found a prevalence of anemia of 17% (range 3-50%) while another showed an age-dependent prevalence of 2.9-61% in men and 3.3- 41% in women.[12,13] 76 Direct comparison with other hospital-based data is difficult, because most of the data available in the literature are derived from community-dwelling residents, in whom a selection bias can be assumed because of their referral to a specialized outpatient clinic.[14] Other studies are based on geriatric patients or on an Indian population, characterized by a different social and ethnic background.[15-17] In general, the findings reported in the literature 81.82.8 and the findings from our study reveal a higher prevalence in hospital-based cohorts than in community-dwelling persons.[18-20] Mean corpuscular volume is used for morphologic classification of anemia. "Normocytic normochromic anemia

was the most common type of Microcytic anemia observed (59.88%), confirming previous studies.[21] Microcytic anemia was the second leading type of anemia. However, except for the correlation between microcytic anemia and iron deficiency, the mean corpuscular volume-based classification of anemia is not reliable and does not mirror the underlying pathogenesis.[11] The present study has some limitations. Analyses were performed on the basis of a single set of laboratory values, rather than repeated measurements and clinical evaluations. Thus, it cannot be said with certainty whether abnormal laboratory parameters were caused by a chronic or an acute condition. Identification of the cause of anemia was also impossible because of the cross-sectional design. Thus, prospective studies are needed to investigate the causes and pathogenesis of anemia. Another limitation of this study is its hospital-based design, which lacks generalization of the findings to all elderly population. Moreover, our cohort was a population of predominantly urban population. Given that geographic differences in the prevalence of anemia are well known, comparisons with other studies should take into account the residential status of the relevant population.[18] Further, the laboratory values for the nutrition-related parameters (iron and vitamin B₁₂) were determined in only 20% of the anaemic patients, which could be viewed as a selection bias. Our study underscores the relevance of anemia in the elderly and contributes to the understanding of its possible causes. Future studies on parameters such as erythropoietin, reticulocyte hemoglobin content, and soluble transferrin receptor will help us to better understand and differentiate the multifactorial pathogenesis of anemia. This will enable individualized treatments based on the substitution of iron, folic acid, and vitamin B₁₂ erythropoiesis-stimulating factors.[22]

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

V. CONCLUSION

It can be concluded that nearly half of the geriatric patients admitted to hospital are anaemic, with normocytic normochromic anaemia being the predominant followed by microcytic and macrocytic.

VI. RECOMMENDATION

As this was a hospital-based study conducted in a single tertiary care centre, future multicenter community-based studies are recommended to enhance the generalizability of the findings across different ethnic groups and geographic regions. Additionally, estimating iron profile, vitamin B₁₂, and folate levels in the entire study population is advised to minimize selection bias and allow for a more accurate assessment of the underlying etiologies of anemia in geriatric patients.

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