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ANAEMIA PATTERNS IN GERIATRIC PATIENTS IN TERTIARY CARE HOSPITAL- A CROSS SECTIONAL STUDY

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ABSTRACT

Background

Anaemia is a significant public health issue, particularly among the geriatric population, where it is often underdiagnosed. It is associated with increased morbidity, hospitalizations, frailty, and diminished quality of life. In India, the prevalence of anaemia among elderly individuals ranges from 21% to 92%. Understanding the patterns and severity of anaemia in geriatric patients is crucial for timely diagnosis and management.

ISSN:0975 -3583,0976-2833 VOL 16, ISSUE 4, 2025

Aim and Objectives

This study aims to evaluate the haematological patterns of anaemia in geriatric patients in a tertiary care hospital. The specific objectives are:

1. To determine the prevalence and severity of anaemia in the elderly population.
2. To classify anaemia based on morphological patterns.
3. To assess the association between anaemia patterns and demographic factors.

Methodology

A cross-sectional study was conducted over six months at the haematology laboratory of BMCH, Chitradurga. A total of 350 geriatric patients (aged 60–90 years) who met the WHO criteria for anaemia were included. Blood samples were collected and analysed using an automated haematology analyser. Peripheral smear examination was conducted to classify anaemia into normocytic normochromic, microcytic hypochromic, macrocytic, dimorphic, and normocytic hypochromic types. The severity of anaemia was categorized as mild, moderate, or severe. Statistical analysis was performed using SPSS software, with a p-value of <0.05 considered significant.

Results

The study found that 59.7% of the anaemic patients were male, and 65% belonged to the 60–70 years age group. Normocytic normochromic anaemia was the most common type (37%), followed by microcytic hypochromic anaemia (33%), dimorphic anaemia (17%), macrocytic anaemia (9%), and normocytic hypochromic anaemia (4%). The majority of patients (52%) had moderate anaemia, while 38% had severe anaemia. Males predominantly exhibited normocytic

ISSN:0975 -3583,0976-2833 VOL 16, ISSUE 4, 2025

normochromic anaemia (38%), whereas microcytic hypochromic anaemia was more common among females (43%).

Conclusion

Anaemia is a prevalent yet often overlooked condition in the elderly population. The most common morphological type observed was normocytic normochromic anaemia. Given its significant impact on functional independence and overall health, early identification and appropriate management of anaemia in geriatric patients are essential to improve their quality of life and reduce associated complications.

Keywords

Anaemia, Geriatric Population, Normocytic Normochromic Anaemia, Microcytic Hypochromic Anaemia.

Introduction

Anaemia is a significant public health concern affecting individuals across all age groups, with a particularly high burden in the elderly population. It is frequently considered a natural consequence of aging and, as a result, is often underdiagnosed or overlooked in clinical practice. However, anaemia in older adults is not merely an incidental finding but a condition with profound implications for overall health, functional capacity, and quality of life. (1, 2)

Globally, approximately one in every four individuals aged 60 years or older is anaemic, with the prevalence varying significantly across regions. In India, anaemia affects an estimated 21% to 92% of the elderly population, making it a major public health issue that warrants urgent

ISSN:0975 -3583,0976-2833 VOL 16, ISSUE 4, 2025

attention. (3) Anaemia in older adults is associated with an increased risk of hospitalisation, frailty, diminished physical and cognitive function, accelerated progression of chronic diseases, and a heightened risk of dementia. Additionally, it contributes to an increased likelihood of falls, reduced independence, and overall morbidity and mortality. (4,5)

By 2050, the global population of individuals aged 60 years and older is expected to double, reaching 2.1 billion. Furthermore, the number of people aged 80 years or older is projected to triple between 2020 and 2050, reaching 426 million. (4) This demographic shift underscores the urgent need for improved geriatric healthcare strategies, including early detection and management of conditions such as anaemia.

Despite the high prevalence and clinical significance of anaemia in elderly individuals, its aetiology remains multifactorial and complex, often involving nutritional deficiencies, chronic inflammatory states, renal insufficiency, haematological disorders, and age-related physiological changes in bone marrow function. Given this complexity, the present study aims to evaluate the haematological patterns of anaemia in geriatric patients, with a particular focus on morphological characteristics. Understanding these patterns is crucial for identifying underlying causes, facilitating targeted investigations, and implementing appropriate management strategies. Early diagnosis and intervention can significantly improve the overall health, functional independence, and quality of life of elderly individuals, reducing the burden of anaemia-related complications on healthcare systems worldwide.

Materials and Methods

ISSN:0975 -3583,0976-2833 VOL 16, ISSUE 4, 2025

This cross-sectional study was conducted in the haematology laboratory of BMCH, Chitradurga, over a period of six months. The study included geriatric patients aged 60 to 90 years who met the WHO criteria for anaemia, defined as haemoglobin levels of <13 g/dL in males and <12 g/dL in females. (6)

Sample Collection and Analysis

Blood samples were collected from eligible participants using EDTA vacutainers to prevent coagulation. The samples were thoroughly mixed and processed within two hours using an automated haematology analyser to ensure accurate readings. The following parameters were recorded:

- Haemoglobin (Hb)
- Red blood cell (RBC) count
- Mean corpuscular volume (MCV)
- Mean corpuscular haemoglobin (MCH)
- Mean corpuscular haemoglobin concentration (MCHC)
- Red cell distribution width (RDW)

Peripheral Smear Examination

To evaluate the morphology of anaemia, blood smears were prepared from each sample, stained using Leishman stain, and examined under a conventional light microscope. The morphological classification included normocytic normochromic, microcytic hypochromic, macrocytic, dimorphic, and other variants of anaemia.

ISSN:0975 -3583,0976-2833 VOL 16, ISSUE 4, 2025

Severity Classification

Anaemia severity was categorised based on WHO cutoffs into:

- Mild anaemia: 11.0–12.9 g/dL in males; 11.0–11.9 g/dL in females
- Moderate anaemia: 8.0–10.9 g/dL
- Severe anaemia: <8.0 g/dL (11)

Statistical Analysis

The data collected were analysed using SPSS software version XX (replace with actual version used). Descriptive statistics, including mean, standard deviation, and frequency distributions, were applied. Chi-square tests and independent t-tests were used to assess the association between anaemia patterns and demographic factors. A p-value of <0.05 was considered statistically significant.

Results

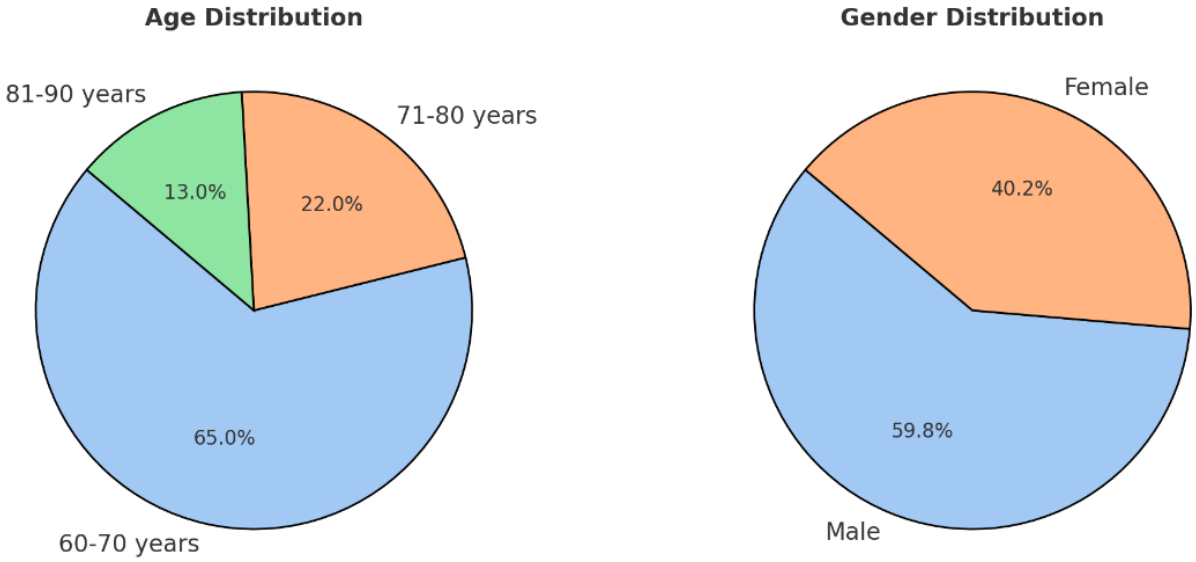
A total of 350 cases of geriatric anaemia were included in the present study, with patient ages ranging from 60 to 90 years. Males accounted for the majority of cases (59.7%), while females comprised 40.2%. The largest group of patients (65%) was in the 60-70 year age group, followed by 22% in the 71-80 year age group, and the smallest group (13%) was in the 81-90 year age group.

Table 1: Age and sex distribution of patients

ISSN:0975 -3583,0976-2833 VOL 16, ISSUE 4, 2025

Age groups	Male	Female	Total
60-70 years	133 (64%)	93 (66%)	226 (65%)
71-80 years	44 (21%)	34 (24%)	78 (22%)
81-90 years	32 (15%)	14 (10%)	46 (13%)
Total	**209**	**141**	**350**

Chart 1: Age and sex distribution of patients



ISSN:0975 -3583,0976-2833 VOL 16, ISSUE 4, 2025

Normocytic normochromic anaemia was the most common morphological type of anaemia, constituting 37% of cases. Microcytic hypochromic anaemia was the second most common type (33%), followed by dimorphic anaemia (17%), macrocytic anaemia (9%), and normocytic hypochromic anaemia (4%). Among male patients, normocytic normochromic anaemia (38%) was the most common, while microcytic hypochromic anaemia (43%) was more prevalent in female patients.

Table 2: Distribution of patterns of anaemia

Pattern of anaemia	**Male**	**Female**	**Total**
Normocytic normochromic	79	45	**124 (35.4%)**
Microcytic hypochromic	56	63	**119 (34%)**
Dimorphic	39	21	**60 (17.1%)**
Macrocytic	24	8	**32 (9.1%)**
Normocytic hypochromic	11	4	**15 (4.3%)**

ISSN:0975 -3583,0976-2833 VOL 16, ISSUE 4, 2025

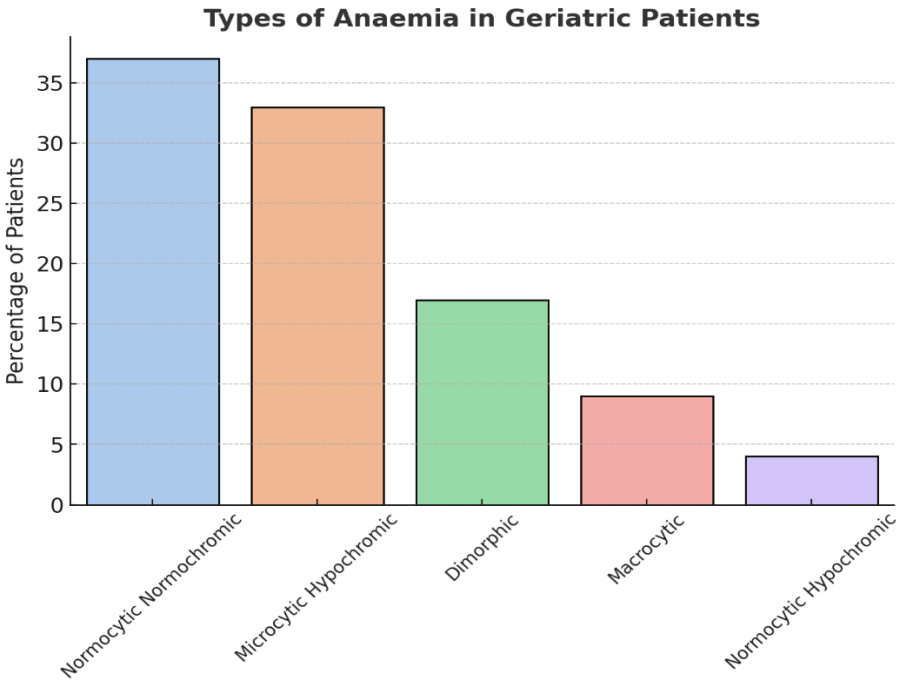


Chart 2: Distribution of patterns of anaemia

Haemoglobin levels were reduced in all patients, ranging from 3.5 - 11 g/dL in females and 4 - 12 g/dL in males. In cases of normocytic normochromic anaemia, MCV was within normal limits, while it was increased in macrocytic anaemia. MCV, MCH, and MCHC were reduced in cases of microcytic hypochromic anaemia, and RDW was elevated in all cases of microcytic hypochromic anaemia. Normal MCV and raised RDW were found in dimorphic anaemia.

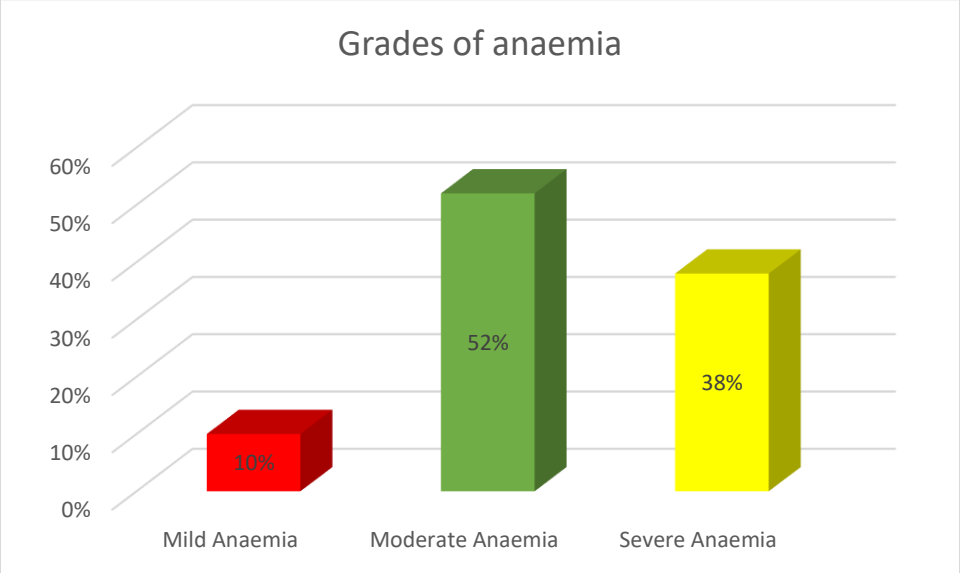
In our study, the majority of patients (52%) had moderate anaemia (Hb of 8 – 11 g/dL) followed by severe degree of anaemia(Hb <8 g /dL) is observed in 32% of cases. while a smaller percentage (16%) had mild anaemia (Hb >11 g/dL). Additionally, 47% of patients exhibited neutrophilia, which may suggest an underlying infection or inflammation.

Table 3: Distribution of degree of anaemia

ISSN:0975 -3583,0976-2833 VOL 16, ISSUE 4, 2025

Grades of anaemia	Total
Mild Anaemia	35 (10%)
Moderate Anaemia	182 (52%)
Severe Anaemia	133 (38%)

Chart 3: Distribution of degree of anaemia



Discussion

In the present study, the highest number of geriatric patients with anaemia were male (60%) compared to females, which is consistent with findings from the studies by Kushtagi A V et al. (56% males, 44% females)[1] and Thotakura M et al. (52% males, 48% females).[2] In contrast to

ISSN:0975 -3583,0976-2833 VOL 16, ISSUE 4, 2025

our study, S Amarneel et al.[7] and Saurabh R Shrivastava et al.[10]found female predominance in geriatric anemia. Large number of patients (63.7%) in our study were in the 60-70 year age group and least number of patients were belonged to 80-90 years , which is in agreement with Choukimath S M's study, where 44.8% of patients belonged to (60-69) age group followed by 42.2% patients in 70-79 years and 12.8 % in 80-90 years age group.[8]

In the studies conducted by Singh R et al.[9] and Choukimath S M et al.[8], the most common morphological type of anaemia was normocytic normochromic anaemia, which correlates with our findings. In our study, 37% of cases exhibited normocytic normochromic anaemia, 33% of cases had microcytic hypochromic anemia, 17% dimorphic anemia, 9% of macrocytic anemia and 4% of normocytic hypochromic anaemia. Kushtagi A V et al.'s study found microcytic hypochromic anaemia to be the most common and normocytic normochromic anemia as second common pattern. [1]

Normocytic hypochromic anaemia was the least common type in our study, which is also observed in Kushtagi A V et al.'s study.[1] In the present study, the most common pattern of anemia in males was normocytic normochromic (38%), while in females, microcytic hypochromic anemia(43%) was the commonest pattern. This corroborates with the findings of Singh R et al.[9] Moderate degree of anaemia (Hb 11-11.9 in females and 11-12.9 in males) was found in a larger proportion of patients (79 out of 350) in our study, which contrasts with Singh R et al.'s[9] study, where mild anaemia was the most prevalent. However studies shows that any degree of anemia is associated with negative effects in elderly individuals.[12]

ISSN:0975 -3583,0976-2833 VOL 16, ISSUE 4, 2025

Conclusion

Anaemia in older adults is often underdiagnosed, as it is assumed to be a natural consequence of aging. However, it is an independent risk factor that can limit independence and negatively affect overall health and quality of life. Anaemia is considered a poor prognostic factor in elderly individuals. Studying the morphological patterns of anaemia and making an accurate diagnosis can help preserve functional capacity, mental health, and prevent complications such as falls, cognitive decline, and other morbidities and mortality.

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ISSN:0975 -3583,0976-2833 VOL 16, ISSUE 4, 2025

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