Section: General Medicine

Original Research Article

OBSERVATIONAL STUDY OF ANEMIA PREVALENCE AND ASSOCIATED CLINICAL PROFILES IN ADULTS ATTENDING GENERAL MEDICINE CLINICS

Pogula Nagarjuna reddy[1], Talikota Shankar kumar[2], U Vivekananda Reddy[3], Tejas Vn[4]

[1]*Associate Professor, Santiram Medical College, Nandyal, Andhra Pradesh, India.*
[2]*Associate Professor, Santhiram Medical College, Nandyal, Andhra Pradesh, India.*
[3]*Asisstant Professor, Department of General Medicine, Nandyal, Andhra Pradesh, India.*
[4]*MBBS, Sri Siddartha Institute of Medical Science, Nelmangala, Karnataka, India.*

Received *: 20/07/2025*
Received in revised form *: 07/09/2025*
Accepted *: 26/09/2025*

Corresponding Author:
Dr. T Shankar Kumar,
Associate Professor, Santhiram Medical College, Nandyal, Andhra Pradesh, India.
Email: talikotashankarkumar@gmail.com

DOI: 10.70034/ijmedph.2025.4.47

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (4); 257-261

ABSTRACT

Background: Anaemia is a major global health concern with significant clinical and socioeconomic consequences, often presenting in adults as a common finding in general medicine clinics. It is associated with reduced quality of life, impaired productivity, and increased morbidity, particularly when coexisting with chronic illnesses. Understanding its prevalence and clinical profiles in outpatient populations is crucial to guide timely diagnosis and targeted management. **Aim:** The present study aimed to determine the prevalence of anaemia and to assess the associated clinical and laboratory profiles among adults attending general medicine outpatient clinics in a tertiary care hospital.

Materials and Methods: This hospital-based observational study included 98 adult patients (aged ≥18 years) attending the general medicine outpatient department who fulfilled the inclusion criteria. Patients with recent blood transfusion, ongoing hematinic therapy, bleeding disorders, or pregnancy were excluded. Clinical history and demographic details such as age, sex, occupation, socioeconomic status, and comorbidities were recorded. Laboratory investigations included complete blood count, peripheral smear, and, where indicated, iron profile, vitamin B12, and folate levels. Anaemia was defined and graded using World Health Organization (WHO) criteria. Data were analysed using SPSS version 26.0, with descriptive statistics and appropriate tests of association applied; $p < 0.05$ was considered significant.

Results: The overall prevalence of anaemia was 63.27% (62/98 patients). Among anaemic individuals, 24.49% had mild, 26.53% moderate, and 12.24% severe anaemia. Females demonstrated a higher prevalence (69.23%) compared to males (56.52%), though the association was not statistically significant ($p=0.214$). Prevalence increased significantly with age ($p=0.041$), being 45.45% in 18–30 years, 58.82% in 31–50 years, and 76.19% in >50 years. Mean haemoglobin (9.82 ± 1.45 g/dL), haematocrit, MCV, and MCH values were significantly lower in anaemic patients compared to non-anaemic counterparts ($p<0.001$ for all), while platelet counts showed no significant difference ($p=0.342$).

Conclusion: Anaemia is highly prevalent in adults attending tertiary care outpatient clinics, with greater burden among females and older age groups. The significant proportion of moderate and severe cases underscores the need for routine screening, early etiological evaluation, and prompt management to reduce morbidity and improve patient outcomes.

Keywords: Anaemia, prevalence, adults, clinical profile.

INTRODUCTION

Anaemia is one of the most common clinical problems encountered in general medicine clinics, cutting across ages and comorbidities and presenting as a final common pathway of diverse pathophysiological processes that range from dietary iron deficiency to chronic inflammation and renal insufficiency.[1] It undermines functional capacity, attenuates quality of life, and amplifies risk in common chronic diseases, making timely recognition and aetiology-focused management central to everyday outpatient care.[1]

From a population perspective, the burden of anaemia is immense, but clinic-based prevalence can appear even higher because outpatient cohorts are enriched for multimorbidity, older age, and referral bias.[2] For clinicians, this epidemiological reality translates into a frequent need to distinguish iron deficiency anaemia (IDA) from other causes (e.g., anaemia of chronic disease, mixed deficiencies, marrow disorders) at the first point of contact, using a limited set of tests that can be staged sensibly over one or two visits.[2]

Modern guidance has refined how anaemia should be defined and measured, emphasizing standardized haemoglobin thresholds, robust sampling practices, and careful interpretation in the context of altitude, smoking, and pregnancy.[3] Such harmonization matters in clinics because prevalence estimates, case-finding thresholds, and audit metrics depend on which cut-offs are applied and how samples are obtained, and misclassification can either delay work-up or lead to unnecessary investigations.[3]

Iron deficiency remains the leading global cause of anaemia and the most actionable in ambulatory practice, where the history often reveals risk factors such as low dietary iron intake, heavy menstrual blood loss, chronic NSAID use, or occult gastrointestinal (GI) bleeding.[4] In this setting, stepwise diagnostic pathways prioritize ferritin (with or without transferrin saturation), followed by targeted GI evaluation in adults—particularly men and postmenopausal women—when iron deficiency is confirmed or strongly suspected.[4]

Evidence-based specialty guidelines provide practical algorithms that are highly transferable to general medicine clinics. The British Society of Gastroenterology (BSG) recommends confirming iron deficiency biochemically, considering celiac screening, and adopting age- and risk-tailored endoscopic evaluation (often bidirectional endoscopy) when appropriate, while avoiding indiscriminate testing that raises cost and yields limited diagnostic value.[5] These pathways help clinicians balance thoroughness (avoiding missed GI malignancy or inflammatory enteropathy) with feasibility (minimizing unnecessary procedures in low-risk adults).[5]

Complementing this, the American Gastroenterological Association (AGA) has issued graded recommendations for the GI evaluation of IDA that clarify when to use non-invasive tests and when to proceed directly to endoscopy, and it discourages routine gastric biopsies for atrophic gastritis in the absence of specific indications.[6] Such guidance is particularly useful in resource-constrained clinics, where judicious sequencing of investigations can shorten time-to-diagnosis and reduce patient burden without compromising safety.[6]

Beyond iron deficiency, anaemia frequently coexists with chronic kidney disease (CKD) in outpatient populations, where reduced erythropoietin production, iron-restricted erythropoiesis, and inflammation converge.[7] Recognizing this phenotype in clinic—often signalled by declining estimated glomerular filtration rate, elevated inflammatory markers, and a blunted reticulocyte response—matters because management must integrate iron optimization with CKD-specific strategies and, when indicated, erythropoiesis-stimulating agents under guideline-driven monitoring.[7]

MATERIALS AND METHODS

This was a hospital-based observational study at a tertiary care teaching hospital. The study was designed to assess the prevalence of anemia and to evaluate associated clinical and laboratory profiles in adult patients attending outpatient clinics. A total of 98 adult patients (aged ≥18 years) who attended the general medicine outpatient clinics during the study period were included. Patients were enrolled consecutively after fulfilling eligibility criteria.

Inclusion and Exclusion Criteria

Patients of both sexes aged 18 years and above who consented to participate were included in the study. Individuals with a history of recent blood transfusion (within 3 months), those on hematinic supplementation, patients with active bleeding disorders, and pregnant women were excluded to avoid confounding factors that could influence hemoglobin levels.

Methodology

After obtaining informed consent, demographic data (age, sex, occupation, socioeconomic status) and relevant clinical history were recorded using a structured proforma. Clinical examination was carried out with particular emphasis on signs of pallor, nutritional status, systemic comorbidities (such as diabetes mellitus, hypertension, chronic kidney disease, and chronic liver disease), and lifestyle factors (dietary habits, alcohol intake, and smoking).

Laboratory Investigations

Venous blood samples were collected under aseptic precautions for detailed laboratory evaluation. A complete blood count (CBC) was performed in all patients to determine hemoglobin concentration, hematocrit values, and red blood cell indices

including mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC). Total leukocyte count, differential leukocyte count, and platelet count were also recorded. Peripheral blood smear examination was carried out in each case to assess red cell morphology and to identify features suggestive of iron deficiency, megaloblastic anemia, or other hematological abnormalities. Where clinically indicated, an iron profile was obtained, which included serum ferritin, serum iron, total iron-binding capacity (TIBC), and transferrin saturation. Biochemical tests such as renal function tests, liver function tests, and fasting blood glucose levels were performed to evaluate systemic comorbidities that could contribute to anemia. In addition, vitamin B12 and folate levels were estimated in patients with macrocytic anemia or unexplained cytopenias to identify nutritional deficiencies as potential etiological factors.

Operational Definition of Anemia

Anemia was defined according to the World Health Organization (WHO) criteria as a hemoglobin concentration of less than 13 g/dL in men and less than 12 g/dL in non-pregnant women. The severity of anemia was further classified into mild, moderate, and severe categories based on standard WHO cut-off values.

Statistical Analysis

All collected data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) version 26.0. Descriptive statistics such as mean, standard deviation, and proportions were used to summarize baseline characteristics. The prevalence of anemia was calculated as a percentage of the study population. Association of anemia with demographic, clinical, and biochemical parameters was assessed using Chi-square test or Fisher's exact test for categorical variables and Student's t-test or ANOVA for continuous variables. A p-value <0.05 was considered statistically significant.

RESULTS

Demographic Profile (Table 1)

Out of the 98 patients included in the study, the largest proportion belonged to the age group above 50 years (42.86%), followed by those in the 31–50 years category (34.69%), while only 22.45% were in the younger age group of 18–30 years. This indicates that the majority of patients attending the medicine outpatient clinic were middle-aged and elderly. The study population had a slight female predominance, with 52 females (53.06%) compared to 46 males (46.94%). Regarding socioeconomic status, almost half of the patients (44.90%) belonged to the middle class, while 36.73% were from the lower socioeconomic group and 18.37% from the upper class, suggesting that anemia is prevalent across all socioeconomic categories but may be more frequent among middle and lower strata.

Prevalence and Severity of Anemia (Table 2)

The overall prevalence of anemia in the study population was 63.27%, with 62 out of 98 patients found to be anemic. Among them, 24.49% had mild anemia, 26.53% had moderate anemia, and 12.24% had severe anemia as per WHO criteria. These findings highlight that anemia is not only common but also frequently presents with clinically significant severity in adults attending tertiary care general medicine clinics.

Anemia According to Sex (Table 3)

When analyzed by sex, anemia was more prevalent among females (69.23%) compared to males (56.52%). Although females showed a higher burden of anemia, the association between sex and anemia prevalence was not statistically significant ($p = 0.214$). This suggests that while biological and social factors may predispose women to anemia, in this study population the difference was not strong enough to reach statistical significance.

Anemia According to Age Groups (Table 4)

Age was found to be a significant determinant of anemia prevalence. The highest prevalence was observed among individuals above 50 years of age, where 76.19% were anemic. In the 31–50 years age group, anemia was detected in 58.82% of patients, while in the youngest group (18–30 years), only 45.45% were anemic. Statistical analysis showed a significant association between age group and anemia prevalence ($p = 0.041$), indicating that the risk of anemia increases with advancing age, possibly due to age-related comorbidities, nutritional deficiencies, and chronic diseases.

Hematological Indices (Table 5)

Comparison of hematological parameters between anemic and non-anemic patients demonstrated significant differences. The mean hemoglobin level was 9.82 ± 1.45 g/dL in the anemic group compared to 13.62 ± 0.84 g/dL in the non-anemic group ($p < 0.001$). Similarly, hematocrit values were significantly lower in anemic patients (30.28 ± 4.36%) than in non-anemic patients (40.12 ± 3.28%) ($p < 0.001$). Red blood cell indices such as MCV and MCH were also markedly reduced in the anemic group, indicating microcytic and hypochromic changes, which are typical of iron deficiency anemia ($p < 0.001$ for both). Platelet counts, however, did not show a significant difference between the two groups ($p = 0.342$), suggesting that platelet parameters are less affected by anemia status. Overall, these hematological findings provide objective evidence of the altered blood indices in anemic patients compared to their non-anemic counterparts.

Table 1: Demographic Profile of Study Participants (N = 98)

Variable	Frequency (n)	Percentage (%)
Age group (years)		
18–30	22	22.45
31–50	34	34.69
>50	42	42.86
Sex		
Male	46	46.94
Female	52	53.06
Socioeconomic status		
Upper	18	18.37
Middle	44	44.90
Lower	36	36.73

Table 2: Prevalence and Severity of Anemia (N = 98)

Anemia Status	Frequency (n)	Percentage (%)
Present	62	63.27
Absent	36	36.73
Severity of Anemia		
Mild	24	24.49
Moderate	26	26.53
Severe	12	12.24

Table 3: Anemia Prevalence According to Sex

Sex	Anemic (n=62)	Non-anemic (n=36)	Total	Prevalence (%)	p-value
Male	26	20	46	56.52	0.214
Female	36	16	52	69.23	

(Chi-square test applied, $p > 0.05$, not statistically significant)

Table 4: Anemia in Relation to Age Groups

Age Group (years)	Anemic (n=62)	Non-anemic (n=36)	Total	Prevalence (%)	p-value
18–30	10	12	22	45.45	0.041*
31–50	20	14	34	58.82	
>50	32	10	42	76.19	

Significant association observed between age group and anemia prevalence ($p < 0.05$).

Table 5: Hematological Indices Among Anemic and Non-Anemic Patients (Mean ± SD)

Parameter	Anemic (n=62)	Non-anemic (n=36)	p-value
Hemoglobin (g/dL)	9.82 ± 1.45	13.62 ± 0.84	<0.001*
Hematocrit (%)	30.28 ± 4.36	40.12 ± 3.28	<0.001*
MCV (fL)	74.52 ± 10.26	87.14 ± 6.54	<0.001*
MCH (pg)	23.12 ± 4.08	29.56 ± 3.12	<0.001*
Platelet count (x10⁹/L)	268.44 ± 76.25	254.12 ± 64.72	0.342

Statistically significant differences observed for hemoglobin, hematocrit, MCV, and MCH between anemic and non-anemic groups ($p < 0.05$).

DISCUSSION

In our tertiary-care outpatient cohort, the overall anemia prevalence was 63.27% (62/98), which is markedly higher than large, population-based estimates for Indian adults. For example, NFHS-5 (2019–21) reported anemia in 57.0% of women (15–49 years) and 25.0% of men (15–49 years) at the national level—substantially lower than our clinic-based figure, consistent with referral and comorbidity enrichment in hospital settings.[8]

The severity pattern in our series—mild 24.49%, moderate 26.53%, severe 12.24%—also contrasts with community elderly data. Debnath et al. (2022), studying urban older adults in West Bengal (mean age ≈69 years), found anemia in 65.0%, distributed as 41.6% mild, 22.8% moderate, and 0.7% severe; our notably higher severe fraction (12.24%) suggests later presentation and greater disease burden among medicine outpatients.[9]

By sex, anemia was more common among females in our cohort (69.23%) than males (56.52%), though not statistically significant (p=0.214). Nationally representative rural data for men by Singh et al. (2022) showed a considerably lower male prevalence (≈25–28%, varying by covariates) than our male outpatient estimate—again highlighting the effect of clinical sampling and multimorbidity in raising observed prevalence.[10]

Age showed a clear gradient in our data—45.45% (18–30 y), 58.82% (31–50 y), and 76.19% (>50 y; p=0.041). This accords with the India-focused meta-analysis of elderly persons by Daniel et al. (2023), which reported high pooled anemia prevalence in those ≥60 y, underscoring aging-related multimorbidity and nutritional vulnerabilities that likely contribute to our highest burden in the >50 y group.[11]

Hematological indices in our study differed as expected between anemic and non-anemic adults:

mean Hb 9.82 ± 1.45 vs 13.62 ± 0.84 g/dL, MCV 74.52 ± 10.26 vs 87.14 ± 6.54 fL, and MCH 23.12 ± 4.08 vs 29.56 ± 3.12 pg (all p<0.001). These patterns mirror the microcytic–hypochromic profile typical of iron deficiency described by Jameel et al. (2017), where reduced MCV/MCH reliably distinguished iron-deficiency states from non-anemic comparators and thalassemia trait.[12]

Our definitions and severity grading followed WHO thresholds (Hb <13 g/dL in men, <12 g/dL in non-pregnant women), which standardize comparisons across settings; applying these criteria to a clinic-enriched population plausibly inflates case capture relative to general surveys, aligning with our higher prevalence and severity mix.[13]

Placing our results in global context, the GBD 2021 analysis estimated an all-age worldwide anemia prevalence of 24.3% (95% UI 23.9–24.7) in 2021, far below our outpatient estimate of 63.27%—a difference consistent with regional and setting-specific drivers (dietary iron/B12 deficits, infection/inflammation, CKD) that concentrate in tertiary-care attendees.[14]

Finally, our demographic profile—with 44.90% middle and 36.73% lower socioeconomic status—fits the well-documented socioeconomic gradient in anemia. Kumar et al. (2021) demonstrated substantial pro-poor inequality in anemia among Indian men, implying that the sizeable share of middle/lower-status attendees in our clinic likely contributes to the high burden we observed.[15]

CONCLUSION

This study highlights a high prevalence of anaemia (63.27%) among adults attending general medicine clinics, with a notable burden of moderate to severe cases. Anaemia was more frequent in females and older adults, and hematological indices reflected predominantly microcytic–hypochromic patterns. These findings emphasize the need for routine screening, early etiological evaluation, and targeted interventions in outpatient settings. Strengthening clinic-based detection can reduce morbidity, improve quality of life, and lessen the healthcare burden associated with anaemia.

REFERENCES

1. World Health Organization. Guideline on haemoglobin cutoffs to define anaemia in individuals and populations. Geneva: WHO; 2024. Available from: https://www.who.int/publications/i/item/9789240088542 World Health Organization+2WHO Iris+2
2. Kassebaum NJ, Jasrasaria R, Naghavi M, et al. A systematic analysis of global anemia burden from 1990 to 2010. Blood. 2014;123(5):615–624. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC3907750/ PMC
3. Snook J, Bhala N, Beales ILP, et al. British Society of Gastroenterology guidelines for the management of iron deficiency anaemia in adults. Gut. 2021;70(11):2030–2051. Available from: https://gut.bmj.com/content/70/11/2030 Gut+2Gut+2
4. Camaschella C. Iron-deficiency anemia. N Engl J Med. 2015;372(19):1832–1843. Available from: https://www.nejm.org/doi/full/10.1056/NEJMra1401038 New England Journal of Medicine
5. Ko CW, Siddique SM, Patel A, et al. AGA Clinical Practice Guidelines on the gastrointestinal evaluation of iron deficiency anemia. Gastroenterology. 2020;159(3):1085–1094. Available from: https://pubmed.ncbi.nlm.nih.gov/32810434/ PubMed
6. Kidney Disease: Improving Global Outcomes (KDIGO) Anemia Work Group. KDIGO Clinical Practice Guideline for Anemia in Chronic Kidney Disease. Kidney Int Suppl. 2012;2:279–335. Available from: https://kdigo.org/wp-content/uploads/2016/10/KDIGO-2012-Anemia-Guideline-English.pdf KDIGO
7. Muñoz M, Acheson AG, Auerbach M, et al. International consensus statement on the peri-operative management of anaemia and iron deficiency. Anaesthesia. 2017;72(2):233–247. Available from: https://pubmed.ncbi.nlm.nih.gov/27996086/ PubMed+1
8. International Institute for Population Sciences (IIPS) and ICF. National Family Health Survey (NFHS-5), 2019–21: India. Mumbai: IIPS; 2021. Available from: https://dhsprogram.com/pubs/pdf/FR375/FR375.pdf
9. Debnath A, Rehman T, Ghosh T, Kaur A, Ahamed F. Prevalence of anemia among elderly population residing in an urban area of West Bengal, India. Indian J Community Med. 2022;47(4):604-608. Available from: https://journals.lww.com/ijcm/fulltext/2022/47040/prevalence_of_anemia_among_elderly_population.28.aspx
10. Singh A, Ram S, Singh S, Tripathi P. Prevalence and determinants of anaemia among men in rural India: evidence from a nationally representative survey. PLOS Glob Public Health. 2022;2(12):e0001159. Available from: https://journals.plos.org/globalpublichealth/article?id=10.1371/journal.pgph.0001159
11. Daniel RA, Kalaivani M, Lakshmy R, Ramakrishnan L, Toteja GS. Prevalence of anemia among the elderly in India: a systematic review and meta-analysis. Cureus. 2023;15(6):e40367. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC10443921/
12. Jameel T, Baig M, Ahmed I, Hussain MB, Alkhamaly MBD. Differentiation of beta thalassemia trait from iron deficiency anemia by hematological indices. Pak J Med Sci. 2017;33(3):665-669. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC5510123/
13. World Health Organization. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Geneva: WHO; 2011. Available from: https://apps.who.int/iris/bitstream/handle/10665/85839/WHO_NMH_NHD_MNM_11.1_eng.pdf
14. GBD 2021 Anaemia Collaborators. Prevalence, years lived with disability, and trends in anaemia burden by severity and cause, 1990–2021. Lancet Haematol. 2023;10(9):e713-e734. Available from: https://www.thelancet.com/journals/lanhae/article/PIIS2352-3026(23)00160-6/fulltext
15. Kumar P, Singh RK, Rai RK. Socio-economic inequality in anaemia among men in India. Public Health Nutr. 2021;24(5):892-903. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC8265140.