

Prevalence Of Anaemia Among Geriatric Population In Rural Area Of Belagavi District – A Community-Based Cross-Sectional Study

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Abstract

Background: The global rise in life expectancy has resulted in a rapidly expanding elderly population, particularly in low- and middle-income countries such as India. Older adults are increasingly affected by chronic and age-related conditions, among which anemia remains a common yet underrecognized public health problem. Anemia in the geriatric population is multifactorial, with contributions from nutritional deficiencies, chronic diseases, and social determinants of health. Although national initiatives such as anemia mukt Bharat exist, elderly-specific interventions remain limited. This study aimed to estimate the prevalence of anemia and its association with dietary factors among the rural geriatric population of Belagavi district.

Materials And Methods: A community-based cross-sectional study was conducted among 260 elderly individuals (≥60 years) residing in the rural field practice area of Belagavi. Data were collected using a pretested and semi-structured questionnaire covering sociodemographic characteristics, dietary profile, and knowledge, attitude, and practices related to anemia. Venous blood samples were collected for estimation of hemoglobin levels and peripheral smear examination. Data were entered and analyzed using IBM SPSS software. Associations were tested using appropriate statistical methods, with a p-value of <0.05 considered statistically significant.

Results: The mean age of the study participants was approximately 67 years. The overall prevalence of anemia among the elderly was 35%. Anemia was more prevalent among males (35.4%) compared to females (26.8%). The findings indicate a substantial burden of anemia among the rural geriatric population, highlighting the need for focused attention on this age group.

Conclusion: The study demonstrates a considerable prevalence of anemia among elderly individuals in rural Belagavi, with a higher proportion observed among males. These findings emphasize the necessity for regular screening, dietary interventions, and improved access to healthcare services for the geriatric population. Integrating elderly-focused strategies into existing anemia control programs is essential to address this neglected public health concern.

Keywords: Anemia, Aged, Rural Population, Nutritional Status, Geriatrics, Public Health.

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INTRODUCTION

Worldwide, there has been a significant increase in life expectancy, resulting in a growing proportion of older individuals across all countries, particularly in low- and middle-income countries such as India. By 2030, approximately one in six people globally will be aged 60 years or above, with the elderly population increasing from

1 billion in 2020 to 1.4 billion. By 2050, this number is projected to double to 2.1 billion, while the population aged 80 years or older is expected to triple to 426 million. Additionally, by 2050, nearly one-quarter of the global population will comprise individuals aged 60 years or above, the majority of whom will reside in developing regions. This demographic transition has been accompanied

by a rising burden of age-related health conditions, including anemia among older adults.^{{1} {2}}

At the biological level, ageing results from the cumulative impact of molecular and cellular damage over time, leading to a gradual decline in physical and mental capacity, an increased risk of disease, and ultimately death. Older age is also characterized by the emergence of complex health states commonly referred to as geriatric syndromes.^[1]

Anemia is a major public health problem among the elderly population in India.^[4] According to the World Health Organization criteria (1968), anemia is defined as a hemoglobin concentration of less than 130 g/L in men and less than 120 g/L in women.^[3] Despite the implementation of national initiatives such as *Anemia Mukh Bharat*, there is no specific categorization or targeted strategy addressing anemia in the geriatric age group, and currently, no national program exclusively focuses on anemia among the elderly in India

The etiology of anemia in older adults is complex and multifactorial, involving nutritional deficiencies, chronic diseases, and social determinants of health. These overlapping biological and social risk factors complicate both diagnosis and management, and a substantial proportion of anemia cases in the elderly remain inadequately evaluated. Compared to other vulnerable age groups, anemia among the elderly has received relatively limited public health attention, underscoring the need for focused research and evidence-based interventions.^[2]

Given the rapid population ageing and the limited data on anemia among elderly individuals in rural settings, there is a pressing need to assess the magnitude of this problem and its contributing factors. Rural elderly populations are particularly vulnerable due to restricted access to healthcare and nutritional resources. Therefore, the present study was undertaken to assess the prevalence of anemia and its association with dietary factors among the geriatric population residing in a rural area, with the aim of generating evidence to inform targeted interventions and policy initiatives for improving elderly health outcomes.

Objectives:

- 1) To Determine the prevalence of Anemia among elderly population in rural area of Belagavi district, Karnataka.
- 2) To assess the knowledge, attitude, and practices (KAP) regarding anemia among this population
- 3) To evaluate the association between KAP scores and the prevalence of anemia in the study group

MATERIALS AND METHODS

Results:

Table /Fig 1 shows the socio-demographic profile of 260 elderly participants. Most (n=189; 72.69%) were aged 60–70 years, followed by (n=55) 21.15% aged 71–80 years and (n=16) 6.15% above 80 years, indicating a predominance of

Study Design and Setting:

A community-based cross-sectional study was conducted from September 2024 to August 2025 in the rural field practice area of Jawaharlal Nehru Medical College, KAHER University, Belagavi. The study covered the geriatric population residing in nine sub-centres under Kinaye Rural Primary Health Centre, which provides geriatric healthcare services

Study Population and Eligibility Criteria:

The study population comprised elderly individuals aged 60 years and above. Elderly persons with known hemoglobinopathies, thalassemia, other blood disorders, chronic renal failure, and those undergoing dialysis were excluded from the study.

Sample Size Calculation:

Given an estimated anaemia prevalence among elderly in Kochi of 60.6% (19), by using formula for estimating proportions $n = Z^2 \times p \times q / d^2$ where n is required sample size, Z is the standard normal deviate corresponding to the desired confidence level (1.96 for 95% confidence), p is prevalence (p = 60.6) q= 1-p (q= 39.4), and d = allowable error (10%) the sample size was calculated to be 260.

Ethical Considerations:

Ethical approval was obtained from the Institutional Ethics Committee prior to initiation of the study (IEC/MDC/JNMCIEC/353). The study was registered with the Clinical Trials Registry of India (CTRI/2025/03/082246). Written informed consent was obtained from all study participants before data collection.

Data Collection Tools and Procedure:

Data were collected using a pretested and predesigned questionnaire that captured sociodemographic details, dietary profile, and factors associated with anemia, as well as the knowledge, attitude, and practices of the geriatric population regarding anemia. Interviews were conducted in the local language to ensure better comprehension. Data collection was carried out on Rural Primary Health Centre outpatient department days and during health check-up camps conducted in the field practice area of the Primary Health Centre.

Laboratory Investigations:

Venous blood (2 mL) was collected aseptically from each participant in EDTA vials to prevent coagulation. The samples were transported within 2–3 hours to a tertiary care hospital for analysis. Haemoglobin estimation was performed using an autoanalyzer, and peripheral smear examination was conducted at the Hi-Tech Laboratory, KLES Dr. Prabhakar Kore Hospital.

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younger elderly. Females comprised 63.46% (n=165). Hindus formed 90.38% (n=235) of the sample, and (n=187) 71.92% lived in joint families. Over half (n=146; 56.15%) were illiterate, and (n=5) 1.92% were graduates. Farmers constituted (n=132) 50.77%, while (n=88) 33.85% were homemakers. Socio-economically, (n=114) 43.85% belonged to Class IV and (n=64) 24.62% to Class III of the Modified BG Prasad scale. Most (n=211; 81.15%) possessed APL/BPL cards, reflecting substantial access to welfare benefits.

Characteristics	Frequency (n)	Percentages (%)
Age Group		
60 to 70	189	72.69%
71 to 80	55	21.15%
>80	16	6.15%
Gender		
Male	95	36.54%
Female	165	63.46%
Religion		
Hindu	235	90.38%
Muslim	25	9.62%
Type of family		
Nuclear	73	28.08%
Joint	187	71.92%
Educational Qualification		
Illiterate	146	56.15%
Primary (1st to 7th)	70	26.92%
High School (8th to 10th)	31	11.92%
PUC	6	2.31%
Diploma	2	0.77%
Degree	5	1.92%
Occupation		
Farmer	132	50.77%
Labourer	22	8.46%
Self employed	4	1.54%
Govt. employee	3	1.15%
Pvt employee	11	4.23%
Home maker	88	33.85%
Socio- Economic Status		
Class 1	5	1.92%
Class 2	36	13.85%
Class 3	64	24.62%
Class 4	114	43.85%
Class 5	41	15.77%

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Do you have APL/BPL Card		
Yes	211	81.15%
No	49	18.85%

Table/Fig 1: Descriptive analysis of Demographic parameters in study population (N=260)

Table /Fig 2 presents the prevalence and severity of anaemia among 260 elderly participants. Overall, (n=91) 35% were anaemic, while (n=169) 65% had normal haemoglobin levels. Among those with anaemia, (n=55) 21.15% had mild anaemia and (n=32) 12.31% had moderate anaemia, with no cases of severe anaemia reported. These findings suggest that anaemia is a significant health concern among the elderly in the study area, affecting more than one-third of the participants. Most cases were mild to moderate in severity, indicating a need for early detection and nutritional or medical interventions to address anaemia in the aging population effectively.

Characteristics of Anaemia	Frequency	Percentages
Present	91	35.00%
Absent	169	65.00%
Anaemia Range		
Normal	173	66.54%
Mild	55	21.15%
Moderate	32	12.31%

Table/Fig 2: Prevalence of Anemia among geriatric people in the study population (N=260)

Table/Fig 3 presents the descriptive analysis of knowledge, attitude, and practice scores among 260 participants. More than half (n=153; 58.85%) demonstrated inadequate knowledge (score ≤ 5.5), while 41.15% (n=107) showed satisfactory understanding. Similarly, 57.31% (n=149) had poor attitudes (score ≤ 10.38) and 42.69% (n=111) reflected favourable ones. Practices were inadequate in 50.77% (n=132) and adequate in 49.23% (n=128) of participants. Overall, these results reveal that although a notable portion of respondents displayed satisfactory knowledge, attitudes, and practices, a significant segment still lacked adequate awareness and healthy behaviours, underscoring the need for enhanced health education and community-based awareness programs.

Knowledge Score	Frequency	Percentages
Poor (≤ 5.5)	153	58.85%
Good (> 5.5)	107	41.15%
Attitude Score		
Poor (≤ 10.38)	149	57.31%
Good (> 10.38)	111	42.69%
Practice Score		
Poor (≤ 7.41)	132	50.77%
Good (> 7.41)	128	49.23%

Table/Fig 3: Descriptive analysis of knowledge, Attitude and Practice score in the study population (N=260)

Table/Fig 4 compares the knowledge, attitude, and practice (KAP) scores of participants in relation to anaemia status. Among those with poor knowledge (≤ 5.5), 39.87% (n=61) were anaemic, whereas only 28.04% (n=30) of participants with good knowledge (> 5.5) were anaemic, showing a statistically significant difference ($\chi^2 = 3.875$, $p = 0.049$). However, variations in anaemia prevalence between poor and good attitude groups (38.93% vs. 29.73%) and between poor and good practice groups (31.06% vs. 39.06%) were not statistically significant ($p = 0.124$ and $p = 0.176$). Thus, improved knowledge was significantly linked with lower anaemia prevalence, unlike attitude and practice.

Knowledge Score	Anaemia		Chi square	P value
	Yes	No		
Poor (≤ 5.5) (N=153)	61 (39.87%)	92 (60.13%)	3.875	0.049
Good (> 5.5) (N=107)	30 (28.04%)	77 (71.96%)		
Attitude Score			2.365	0.124
Poor (≤ 10.38) (N=149)	58 (38.93%)	91 (61.07%)		
Good (> 10.38) (N=111)	33 (29.73%)	78 (70.27%)		
Practice Score			1.829	0.176
Poor (≤ 7.41) (N=132)	41 (31.06%)	91 (68.94%)		
Good (> 7.41) (N=128)	50 (39.06%)	78 (60.94%)		

Table/Fig 4: Comparison of knowledge, Attitude and Practice score between anemia (N=260)

DISCUSSION

The present study found that approximately one-third of the rural geriatric population was anaemic, with most cases falling within the mild to moderate category. This finding is comparable to national estimates from the Longitudinal Ageing Study in India (LASI 2020) reported by Bloom et al. (5), which documented an anaemia prevalence of 34.3% among individuals aged 60 years and above. Similar prevalence rates have been reported by Gowda et al. in North India (38.6%) (6) and by Swami et al. in rural Karnataka (32.7%) (7), indicating that the burden of anaemia among elderly populations remains consistent across different regions of India. The predominance of mild-to-moderate anaemia observed in this study reflects a chronic pattern commonly seen in older adults, often linked to nutritional deficiencies and chronic inflammatory conditions, as described by the World Health Organization (9).

The majority of participants in the present study belonged to the 60–70-year age group, which is similar to findings reported by Joshi et al. in their study on morbidity patterns among the rural elderly in Maharashtra (10). The higher proportion of elderly women observed in the study reflects demographic trends associated with increased female life expectancy. Additionally, the high prevalence of illiteracy and low socio-economic status noted among the study participants is consistent with observations made by Tiwari

et al. (11), who identified poor education and social disadvantage as major contributors to adverse health outcomes among older adults in India.

In the present study, a substantial proportion of elderly participants demonstrated inadequate knowledge, attitude, and practices related to anaemia. Similar findings have been reported by Rishi et al., where limited awareness and poor understanding of anaemia were common among elderly individuals (12). Poor health literacy, particularly in rural settings, has been recognised as a key determinant of suboptimal health behaviours, as highlighted by Stephen (13).

A significant association was observed between knowledge levels and anaemia status in the present study, with higher prevalence of anaemia among participants with poor knowledge. This finding is supported by the study conducted by Anon et al. (14), which demonstrated that better dietary awareness was associated with improved haemoglobin levels among elderly women. Knowledge may therefore serve as an enabling factor influencing dietary behaviour, health-seeking practices, and early recognition of anaemia-related symptoms, consistent with principles described in health behaviour theories by Glanz and Rimer (15).

However, attitude and practice scores were not significantly associated with anaemia status in the present study. Similar observations were reported by Shirish et al. (16), where

increased knowledge did not consistently translate into improved practices due to persistent socio-cultural and economic barriers. Among elderly populations, factors such as dependence on caregivers, financial constraints, dietary limitations, and multiple comorbidities further restrict the adoption of health-promoting practices, as described by Ann Miller et al. (17).

The overall prevalence of anaemia observed in the present study falls within the range reported by previous Indian studies (30–55%), including those by Swami et al. (7), Anita et al. (11), and Anon et al. (14). The significant association between knowledge and anaemia status observed in this study is also comparable to findings reported by Binlian et al. (18) among adult populations in Karnataka. However, the absence of a significant association between practice and anaemia suggests that age-specific structural and social barriers may limit behavioural change among elderly individuals.

The findings of the present study highlight the need for community-based anaemia screening and targeted health education programmes for the elderly. Strengthening geriatric health services through the involvement of frontline health workers such as ASHAs, Anganwadi workers, and Village Health Sanitation and Nutrition Committees (VHSNCs) may help improve awareness and early detection of anaemia. Integrating nutritional counselling, iron and folic acid supplementation, and management of chronic diseases into geriatric care services may further reduce the burden of anaemia in this vulnerable population.

STRENGTHS AND LIMITATIONS:

The strengths of the present study include its community-based design, adequate sample size, and the inclusion of behavioural components such as knowledge, attitudes, and practices (KAP), which are often underexplored in studies on anaemia among older adults. The assessment of KAP provides additional insight into behavioural factors associated with anaemia in the geriatric population.

The study has certain limitations. The cross-sectional design limits causal inference between the identified factors and anaemia. Information on knowledge, attitudes, and practices was self-reported and may therefore be subject to reporting bias. Additionally, as the study was conducted in a specific rural setting, the findings may not be generalisable to elderly populations in other geographic or urban contexts.

CONCLUSION:

The present study demonstrates a substantial prevalence of anaemia among older adults in a rural setting, highlighting it as an important yet under-recognised public health concern. The findings indicate that knowledge regarding anaemia and nutrition is significantly associated with

anaemia status among the elderly. These results suggest that improving awareness related to diet, iron-rich foods, and early symptom recognition may contribute to better anaemia control in this age group.

Strengthening routine screening and timely management of anaemia through primary healthcare services is essential to prevent complications and support healthy ageing. Adopting community-based and family-supported approaches, with the involvement of caregivers and frontline health workers, may help improve awareness and facilitate appropriate preventive practices among the elderly population.

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