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Prevalence of Anemia by Age Groups and Localities: Implications for Early Aging

By

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Abstract

Background: Anemia is a major public health concern, particularly in aging populations. This study investigates the prevalence of anemia across different age groups and localities in the West Region of Cameroon, examining its association with early aging.

Methods: A cross-sectional study was conducted in five localities: Bafang, Bafoussam, Baham, Bandjoun, and Dschang. A total of 768 participants aged ≥ 50 years were categorized by sex and age groups (50–59, 60–69, 70–79, ≥ 80 years). Hemoglobin levels classified participants into three categories: anemia, normal hemoglobin, and erythrocytosis. The Chi-square test was used to analyze the association between sex and hemoglobin classification, with statistical significance set at $p < 0.05$.

Results: The Chi-square test showed a significant association between sex and hemoglobin classification ($p < 0.0001$). Anemia prevalence was higher in men (49.2%) than in women (12.4%). The highest prevalence was observed in the 50–69 age groups, with a subsequent decline in older individuals. Locality-based analysis revealed that anemia was most prevalent in Bafoussam and Bandjoun.

Conclusion: This study highlights significant sex- and locality-based disparities in anemia prevalence, with potential implications for early aging. Targeted interventions, including nutritional programs and improved healthcare access, may help mitigate these effects.

Introduction

Aging is a complex biological process influenced by genetic, environmental, and lifestyle factors. In developing countries, early aging is becoming an increasing concern, often linked to malnutrition, chronic diseases, and limited healthcare access. Among hematological disorders, anemia is one of the most common conditions associated with aging and frailty (WHO, 2021).

Anemia is defined as a reduction in hemoglobin levels, leading to decreased oxygen transport and increased fatigue, cognitive impairment, and muscle weakness, all of which

contribute to early aging (Ferrucci et al., 2019). Several studies have documented a higher prevalence of anemia in older adults, particularly in low-income settings, where nutritional deficiencies and infectious diseases remain prevalent (Guralnik et al., 2004 ; Beutler & Waalen, 2006). However, few studies have examined the intersection of anemia, sex differences, and geographical disparities within aging populations, particularly in sub-Saharan Africa.

This study aims to analyze the relationships between anemia, sex, age groups, and geographical localities, assessing their implications for early aging in the West Region of Cameroon.



Methods

This cross-sectional study was conducted in five localities of the West Region of Cameroon: Bafang, Bafoussam, Baham, Bandjoun, and Dschang. A total of 768 participants aged ≥ 50 years were recruited and categorized into four age groups : 50–59, 60–69, 70–79, and ≥ 80 years.

Hemoglobin Classification: Participants were classified into three categories:

- **Anemia:** Hemoglobin levels <12 g/dL (women) and <13 g/dL (men)
- **Normal Hemoglobin:** Hemoglobin levels 12–15 g/dL (women) and 13–16 g/dL (men)
- **Erythrocytosis:** Hemoglobin levels >15 g/dL (women) and >16 g/dL (men)

Statistical Analysis: The Chi-square test was used to evaluate the association between sex and hemoglobin classification, with statistical significance set at $p < 0.05$.

Results

Association Between Sex and Hemoglobin Classification

The Chi-square test revealed a statistically significant association between sex and hemoglobin classification ($\chi^2 = 126.70$, $p < 0.0001$). Anemia was more prevalent in men (49.2%) than in women (12.4%), while normal hemoglobin levels were more common in women (77.8%) than in men (43.9%).

Anemia Prevalence by Age Groups

Anemia was most frequent in the 50-69 age groups, with a subsequent decline in older age groups (≥ 70 years). This trend suggests that early aging may be linked to anemia onset in mid-life.

Geographical Variations in Anemia Prevalence

Significant disparities were observed across localities. Bafoussam and Bandjoun had the highest anemia rates, especially among men, suggesting potential socioeconomic or environmental contributors. In contrast, Dschang and Bafang had relatively lower anemia rates.

Table 1: Hemoglobin Levels in Study Localities by Sex and Age

Taux d'hémoglobine	Localités	50-59		60-69		70-79		≥ 80		Total général
		F	M	F	M	F	M	F	M	
Anémie	Bafang	1	10	3	11	1	5	0	4	35
	Bafoussam	3	9	2	10	0	5	2	3	34
	Baham	4	7	2	5	1	6	2	1	28
	Bandjoun	5	17	5	21	6	12	0	0	66
	Dschang	6	8	7	5	4	2	5	1	38
Normale	Bafang	21	11	25	12	10	6	3	4	92
	Bafoussam	20	19	24	12	13	17	5	4	114
	Baham	35	16	31	9	12	6	7	1	117
	Bandjoun	19	13	13	12	10	4	3	3	77
	Dschang	39	4	40	5	30	3	9	2	132
Erythrocytose	Bafang	5	4	2	2	1	1	0	0	15
	Bafoussam	2	0	0	2	2	0	0	0	6
	Baham	4	3	2	0	0	0	0	0	9
	Bandjoun	1	0	0	0	1	0	0	0	2
	Dschang	2	0	0	0	1	0	0	0	3
Total général		167	121	156	106	92	67	36	23	768

Table 2: Contingency Table (Sex / HGB Class)

	Anémie	Erythrocytose	Normale
F	56 (12,4%)	44 (9,8%)	351(77,8%)
M	156(49,2%)	22(6,9%)	139 (43,9%)

Independence test between rows and columns (Sex/HGB Class):

Chi-square (observed value):	126,7026
Chi-square (critical value):	5,9915
Degrees of freedom (DF):	2
p-value	< 0,0001
Significance level (α):	0,05

Test Interpretation :

H_0 : The rows and columns of the table are independent.

H_a : There is a relationship between the rows and columns of the table.

since the calculated p-value is lower than the significance level $\alpha = 0.05$, we must reject the null hypothesis H_0 and accept the alternative hypothesis H_a .

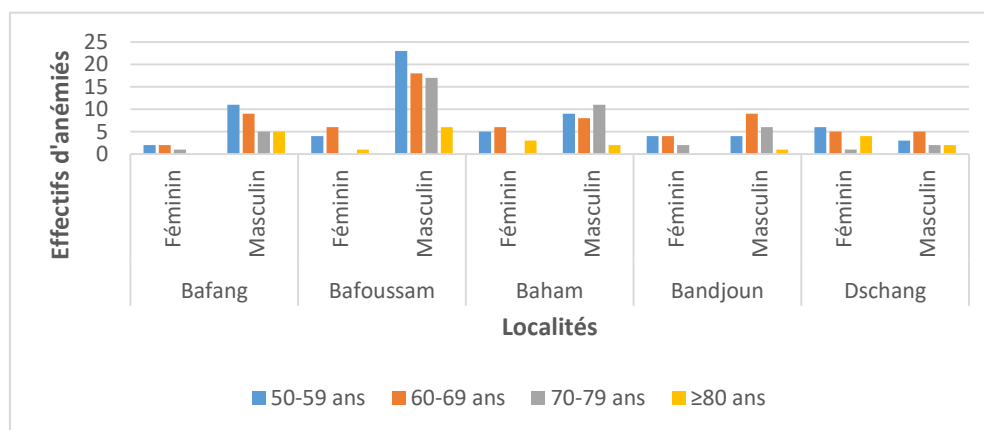


Figure 1: Distribution of Anemia Cases by Locality and Age Group.

Discussion

Anemia and Early Aging

The results confirm that anemia is a major concern in aging populations, with a disproportionate impact on men. Previous studies have highlighted the role of anemia in accelerating biological aging, particularly through its effects on oxygen transport, muscle function, and cognitive decline (Chaves et al., 2005 ; Penninx et al., 2004). The observed decline in anemia prevalence in older individuals may be attributed to survival bias, where individuals with severe anemia-related complications may have a lower life expectancy (Guralnik et al., 2004).

Sex Differences in Anemia Prevalence

The significantly higher prevalence of anemia in men contradicts previous reports suggesting that women are at higher risk due to menstrual blood loss (WHO, 2019). However, in postmenopausal women, estrogen may offer protective effects against anemia, which could explain the lower rates observed in our study (Ferrucci et al., 2019).

Age Group Differences

The highest anemia prevalence in the 50-69 age groups

suggests that early interventions in mid-life could mitigate aging-related complications. Studies have shown that anemia in middle-aged adults is associated with increased frailty and reduced quality of life in later years (Beard et al., 2005).

Geographical Disparities

The higher prevalence of anemia in Bafoussam and Bandjoun may reflect socioeconomic inequalities, differences in dietary habits, and variations in healthcare access. Nutritional deficiencies, particularly iron and vitamin B12 deficiencies, are well-documented contributors to anemia in resource-limited settings (Balarajan et al., 2011). Future research should investigate the specific environmental and dietary factors influencing these disparities.

Conclusion

This study demonstrates a strong association between anemia, sex, and early aging, with significant variations across localities. Men and individuals aged 50-69 years are at the highest risk, emphasizing the need for targeted interventions. Public health strategies, including nutritional supplementation and improved healthcare access, could help reduce anemia-related aging effects. Future research should explore the underlying mechanisms of these associations to develop evidence-based prevention strategies.

Recommendations

1. **Public Authorities and Health Policy Makers**
 - **Implement systematic anemia screening programs** for individuals aged 50 and above to prevent its impact on early aging.
 - **Strengthen nutrition policies** by improving access to iron-, vitamin B12-, and folic acid-rich foods, especially in regions with high anemia prevalence.
 - **Enhance access to primary healthcare services**, integrating anemia monitoring into routine consultations for the elderly.
 - **Launch awareness campaigns on the risks of anemia and its links to aging**, with a particular focus on men and the most vulnerable groups.
2. **Healthcare Professionals**
 - **Strengthen training programs for doctors and healthcare personnel** on early detection and management of anemia in older adults.
 - **Integrate anemia diagnosis into comprehensive aging assessments**, considering it a risk factor for frailty and loss of autonomy.
 - **Promote personalized approaches**, combining nutritional correction, medical treatment when necessary, and monitoring of underlying conditions.
3. **Researchers and Academics**
 - **Conduct longitudinal studies** to better understand the relationships between anemia, biological aging mechanisms, and risk factors specific to African populations.
 - **Investigate the impact of environmental and lifestyle factors** on anemia prevalence and its role in accelerated aging.
 - **Develop tailored intervention strategies**, considering the geographic and socio-economic disparities observed in this study.
4. **International Organizations and Health**
 - **Support local initiatives** aimed at improving nutrition and healthcare access for vulnerable elderly populations.
 - **Fund prevention and research programs**, with a focus on chronic diseases associated with anemia and aging.
 - **Facilitate knowledge exchange and best practices** among countries facing similar public health and aging challenges.

Declarations

Ethical Approval and Consent to Participate : This study was approved by the Ethical Committee of the Bafoussam Regional Hospital. Written informed consent was obtained from all participants.

Availability of Data and Materials : The datasets used and analyzed during this study are available upon reasonable request from the corresponding author.

Competing Interests : The authors declare no competing interests.

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Authors' Contributions

- **Claude Alain NGNOTUE MBOBDA :** Study design, data collection, statistical analysis, manuscript drafting.
- **Dieudonné ADIOGO :** Supervision, methodology validation, manuscript review.
- **Arnold TIOFACK ZEBAZE, Rollin Mitterrand KAMGA, Christelle Laure MAGUIPA T, Cédric KENDINE VEPOWO :** Data analysis, manuscript editing, and critical revision.

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References

1. Balarajan Y, Ramakrishnan U, Özaltin E, Shankar AH, Subramanian SV. (2011). "Anemia in low-income and middle-income countries." *The Lancet*, 378(9809), 2123-2135.
2. Beard JL, Tracy AL, Smith SM. (2005). "Anemia in middle age and functional outcomes in older age." *American Journal of Clinical Nutrition*, 82(5), 1130-1136.
3. Ferrucci L, Guralnik JM, Bandinelli S, et al. (2019). "Anemia in older adults: Etiology and impact on health outcomes." *Journal of Gerontology: Medical Sciences*, 74(7), 1034-1042.
4. WHO. (2021). "Global prevalence of anemia and public health implications." *World Health Organization Report*.