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Original article

Prevalence of anemia in a sample of elderly southeastern Brazilians



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ABSTRACT

Objective: To demonstrate the proportion of anemia and its association with demographic and clinical characteristics in a representative sample of elderly people from São José dos Campos, São Paulo.

Methods: Demographic data and blood samples were collected from 398 over 65-year-old male and female individuals. Anemia was defined as hemoglobin concentration <12 g/dL in women and <13 g/dL in men. Anemic and non-anemic groups were compared using the chi-squared test and a multiple logistic regression model.

Results: The prevalence of anemia was 18.6% (20.8% in men and 17.6% in women). The percentages of anemia rose significantly across the age groups >75–80, >85–90 and >90–95 years (p -value = 0.0251). There were no significant differences in gender, ethnic background, place of residence, years of schooling, income, comorbidities and use of medications. According to gender, the mean hemoglobin concentration and mean corpuscular volume were 11.5 g/dL (range: 8.4–11.9 g/dL) and 90.7 fL (range: 63.0–111.7 fL) for women and 11.9 g/dL (range: 8.6–12.8 g/dL) and 92.1 fL (range: 59.8–100.1 fL) for men. The great majority of anemia cases were mild with less than 6% having hemoglobin concentrations below 10.9 g/dL. Mean corpuscular volume was lower than 80 fL in six cases (8%), between 80 and 100 fL in 65 cases (88%) and higher than 100 fL in three cases (4%).

Conclusion: A total of 18.6% of elderly people from São José dos Campos had mild anemia with the majority being normocytic. The percentages of anemia rose as the age increased demonstrating an association between age and anemia.

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Introduction

It has been demonstrated that anemia among older people is associated with a variety of adverse outcomes, including mortality.^{1,2} Estimates of the prevalence of anemia in elderly populations depend on demographic aspects, location and the health status of the individuals.³

In Brazil there are few studies in this field of research. To the best of our knowledge the prevalence of anemia was well documented in elderly individuals from only two urban regions located in the northeastern⁴ and southern regions.⁵

Considering the impact of anemia on the aged and the paucity of comparative data in Brazil, it seems that additional studies from different regions are needed. The population of São José dos Campos, the largest city in the Vale do Paraíba (State of São Paulo), is aging because of lower birth rates as demonstrated by the evolutionary analysis of its population pyramid.⁶ Therefore, the objectives of this study were to analyze the prevalence of anemia and its association with demographic characteristics in a sample of elderly people from São José dos Campos, southeastern Brazil.

Methods

This study was carried out at the Centro de Hematologia do Vale (CHV) and the Hospital Pio XII in São José dos Campos. The study was approved by the Research Ethics Committee of the Universidade Paulista (# 481190) and all participants signed written consent forms. According to Brazilian Institute of Geography and Statistics (IBGE, 2010)⁷ the estimated numbers of elderly residents were 19,619 females and 17,810 males aged from 60 to 69 years and 14,416 females and 10,061 males older than 70 years. A sample size of 398 was calculated based on an estimated prevalence of anemia in older people of 20%, a 95% confidence interval and a sample error of 5%. The inclusion criteria of the study were over 65-year-old individuals, both males and females, who had not been transfused with red blood cells within the previous 12 weeks. A questionnaire was developed by the CHV regarding demographic and clinical aspects. People were invited to participate in the study through the local media including newspapers, television and social networks. One-day events were organized in central community meeting points of all six urban areas of São José dos Campos (north, east, center, southeast, south and west); in these places students, physicians and health professionals randomly applied the questionnaire to elderly local residents. In a second phase, the participants were invited to give blood samples in two clinical biochemistry laboratories in the Hospital Pio XII. Overall, 713 people were interviewed and 415 (58.2%) gave blood samples. The samples were obtained from the median cubital vein using an evacuated tube system. Volunteers who did not answer the questionnaire or from whom an inadequate blood sample was collected were excluded from the study. The final study sample included 398 elderly people interviewed between May 2012 and November 2013. The World Health Organization (WHO) criteria were used to define anemia (hemoglobin concentration <12 g/dL in women and <13 g/dL in men) and assess severity.⁸ Anemic and non-anemic

groups were compared using the chi-squared test and a multiple logistic regression model; *p*-values of less than 0.05 were considered significant.

Results

The prevalence of anemia in this sample was 18.6% (20.8% in men and 17.6% in women). The percentages of anemia rose significantly across the age groups >75–80, >85–90 and >90–95 years (*p*-value = 0.0251). No significant differences were observed for the other variables analyzed in this study (gender, ethnic background, place of residence, years of schooling, income, comorbidities and use of medications – Table 1).

Hemoglobin concentration and mean corpuscular volume (MCV) of the anemic group according to gender are shown in Table 2. Overall, the great majority of anemia cases were mild with less than 6% having hemoglobin concentrations below 10.9 g/dL. The MCV was lower than 80 fL in six cases (8%), between 80 and 100 fL in 65 cases (88%) and higher than 100 fL in three cases (4%).

Discussion

This study has limitations. It was carried out based on cross-sectional data, and therefore, no cause-effect relationship could be established. This is only a descriptive study that reports the proportion and severity of anemia in general.

The overall prevalence of anemia in this series was 18.6% with a significant association being demonstrated between age and anemia. In a prospective population-based study of all over 64-year-old residents in Biella (Italy), anemia was found in 11.8% with the prevalence and incidence of anemia increasing with age.⁹ In a study performed in Germany, the prevalence of anemia of participants aged 65 or older was 4.3% again with the incidence increasing with age.¹⁰ A prospective study conducted in elderly Koreans demonstrated that the overall prevalence of anemia was 13.6% and a significant association was observed with age.¹¹ Data from the United States population assessed in the Third National Health and Nutrition Examination Survey (NHANES III) identified anemia in 10.6% of people aged 65 years and older; anemia increased with age reaching the highest prevalence in the 85 years and older age group.¹² On the other hand, data from low and middle-income countries are sparse. Bryce et al.¹³ surveyed 10,915 people aged 65 years and over in catchment areas in Cuba, Dominican Republic, Puerto Rico, Venezuela and Mexico and found anemia prevalence rates of 19.2%, 37.3%, 32.1%, 9.8% and 9.2% respectively; in all these countries anemia increased with age. In a population-based study performed among 392 free-living elderly in south Brazil, the overall prevalence of anemia was 12.8% and this increased with age.⁵ Moreover, a cross-sectional study carried out in Camaragibe (northeastern Brazil) involving 284 subjects aged 60 years and over showed that the prevalence of anemia was around 11%.⁴

Data regarding the proportion of anemia in men and women and the relationship between anemia and ethnic background have also been described.^{3,12} Although females predominated in this study, a higher occurrence of anemia was observed in older men confirming results previously

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