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Characteristics of Anemia in the Elderly: Hospital-Based Study in West Java

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ABSTRACT

Geriatric anemia can cause many problems and is a major health condition worldwide and in Indonesia. It is important to know the characteristics and prevalence of anemia among geriatrics in Indonesia, especially in West Java. By using simple hematology parameters to detect anemia in geriatrics, and then giving adequate treatment, morbidity, and mortality due to anemia may decrease in geriatrics. This study aimed to identify the type of anemia, etiology, age, gender, and prevalence of elderly patients with anemia in West Java. This was a cross-sectional study. Patients above 59 years old attending the geriatric clinic in Hasan Sadikin General Hospital and the geriatric community was included in this study to be evaluated for anemia, the characteristics of anemia (normocytic, microcytic, and macrocytic) based on MCV and MCHC, age group (<=65 and > 65 years old), and gender. Among 247 elderly patients, anemia was found in 33 patients (13.64%) and mostly found in females. Mostly represented as normochromic normocytic anemia (78.8%) and microcytic hypochromic anemia (21.2%), respectively. Individuals older than 65 years old were mostly presented with microcytic hypochromic anemia (66.7%). Meanwhile, normocytic normochromic anemia was more commonly found in individuals below 65 years old (12.1%). Anemia was commonly found in people older than 65 years old. The most common type of anemia in geriatrics in West Java was normocytic normochromic. Females experience anemia more than males.

Keywords: Anemia, elderly, West Java

INTRODUCTION

Anemia is a global health problem, mostly occurring in the older age population and causing a lower quality of life in geriatrics.[1] According to World Health Organization (WHO), 64 million or 23.9% of elderly people suffer from anemia worldwide, while in Indonesia 26.2% of the elderly suffer from anemia.[2,3] Approximately 40% of the elderly came to the hospital with anemia, while 47% of the elderly in nursing homes have anemia.[4] This condition is a big challenge due to the increasing population of geriatrics with an estimation of 1.2 billion elderly in 2025 worldwide.[5] Meanwhile in Indonesia, there are 21 million elderly and estimated to increase to 33.7 million in 2025.[2]

Anemia is a condition in which the number and size of erythrocytes or hemoglobin concentration are beneath the normal value.[2] Individuals with hemoglobin (Hb) levels less than 13 g/dL in males and less than 12 g/dL in females were diagnosed with anemia.[6] Based on the etiology, anemia can be categorized into nutritional deficiency anemia, anemia caused by bleeding, anemia associated with chronic inflammation and chronic kidney disease, and clonal anemia. In some individuals, the etiology of anemia can be unknown and thus categorize as Unexplained Anemia (UA). Unexplained anemia in geriatrics usually appears with mild symptoms and a hemoglobin level of 1 g/dL below WHO standards.[4,7] Furthermore, anemia is associated with several morbidities and mortality, for instance, psychiatric-related disorders, reduced cognitive capacity, lower quality of life, high hospitalization rate, and increased mortality.[7]

Iron deficiency anemia is the most common type of nutritional deficiency anemia, categorized as microcytic and hypochromic, and appears with a low Mean Corpuscular Volume (MCV) and Mean Corpuscular Hemoglobin Concentration (MCHC).[4,6] Megaloblastic anemia was classified as normochromic macrocytic anemia associated with folic acid or vitamin B12 deficiency, it is characterized by an increased level of MCV.[8] Anemia in Chronic

Kidney Disease (CKD) or chronic disease is defined as mild to moderately severe anemia caused by systemic inflammation that decreases the production of erythrocytes. It is characterized by normal MCV and MCHC levels, but in some cases, it can appear similar to iron deficiency anemia.[9]

In the treatment of anemia, it is necessary to establish the primary diagnosis and accompanying diseases.[4] There are no definitive guideline treatments for anemia in geriatric, thus the management of anemia is similar to other age populations which specifically treat the underlying causes. For instance, iron deficiency anemia must be treated with adequate nutritional iron, and anemia due to CKD must be managed with erythropoietin and intravenous iron supplementation.[10]

METHODS

This was a retrospective observational study of hematological parameters in 242 patients over 59 years attending the geriatric clinic in Hasan Sadikin General Hospital and the geriatric community. Patients were evaluated for anemia based on WHO standards (Hb less than 13 g/dL in males and Hb less than 12 g/dL in females). Data were analyzed using the patient's medical records. Patients' ages were categorized into two groups: above 65 and below 65 years old. Several hematological parameters were conducted including Hemoglobin (Hb), Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin Concentration (MCHC), and Mean Corpuscular Hemoglobin (MCH). Anemia was classified into microcytic hypochromic, macrocytic normochromic, and normocytic normochromic anemia based on hematologic parameters. For statistical analysis, Statistical Package for the Social Sciences (SPSS) version 26 for Windows was utilized to discrete data as frequencies and percentages.

This research was carried out after obtaining ethical clearance by considering respect for the subject, beneficence, non-maleficence, and justice from the Health Research Ethics Commission (KEPK) Faculty of Medicine, Padjajaran University, Bandung with number 43/UN6.KEP/EC/2020.

RESULTS AND DISCUSSIONS

A total of 247 patients were initially recruited. However, laboratory data could only be retrieved from 242 patients consisting of 175 females and 67 males with a mean age of 68.7 years old. The female: male ratio in the study (of all 242 patients) was 2.6:1 whereas the female: male ratio for those with anemia was 1.8:1. There were 176 patients over 65 years, microcytic anemia detected in 5 (15%) compared with 6% in those under 65 years. The data replicates other studies. These patients mostly suffered from hypertension, followed by arthritis, gastrointestinal disease, and benign prostate hyperplasia as depicted in Table 1.

From the laboratory data collected, only 33 patients (13.64%) suffered from anemia with mean hemoglobin, MCV, and MCHC 13.4, 92.7, and 34.4, respectively. Anemic individuals were mostly represented as normochromic normocytic anemia (78.8%), while others suffered from microcytic hypochromic anemia (21.2%) as depicted in Table 2.

Grouped patients from all anemic patients into two age groups (≤ 65 years old and > 65 years old) and anemia characteristics by gender as depicted in Table 3. A higher prevalence of anemia was found in males, this might be due to the WHO cut-point for males below 13 g/dL.

Anemia is mostly manifested by multifactorial etiologies, it is rarely caused by a single reason. Complete hematological parameters, the patient's comorbidity, and past medical history need to be

Table 1. Clinical characteristics of geriatric patients in Hasan Sadikin General Hospital

	N	%
Gender		
Male	67	27.69%
Female	175	72.31%
Age group		
≤ 65 y.o	66	27.27%
> 65 y.o	176	72.73%
Comorbidity		
Hypertension	131	
Arthritis (Osteoarthritis, Gout Arthritis, Unspecified Arthritis)	59	
Gastrointestinal disease	33	
Benign Prostate Hyperplasia (BPH)	13	

examined to diagnose anemia in geriatrics. The prevalence of anemia increases with age varying from 11% to 60% in Western countries. Based on National Health and Nutrition Examination Survey-II (NHANES-II) data in north-America, anemia found in males and females was 11% and 10.2%, respectively. Furthermore, a study of the Italian population shows that individuals older than 65 years were 11% anemic.[11] However, it increases greatly in hospitalized patients, ranging from 48%-60%.[12] These studies were consistent with our study that showed 6% of male and 10.6% of female patients were diagnosed with anemia.

Anemia causes hypoxia, which can lead to organ malfunction. In the worst case, it can cause organ failure if it persists. In young individuals, their organ reserves are capable of compensating for hypoxia caused by anemia, while geriatrics are not able to compensate for hypoxia caused by anemia due to reduced functional organ reserves and increased risk of frailty.[13,14] Geriatric patients with anemia show higher morbidity and are associated with a higher risk of cardiovascular disease, hypertension, inflammation, cognitive dysfunction, risk of falling, poor quality of life, increased hospital length of stay, and readmissions.[10,15]

Table 2. Distribution of patients with anemia in Hasan Sadikin General Hospital

	Anemia (%)
Gender	
Male	12 (17.91%)
Female	21 (12%)
Classification	
Microcytic hypochromic	7 (21.2%)
Normocytic normochromic	26 (78.8%)
Macrocytic hyperchromic	0
Comorbidity	
Hypertension	15 (45.5%)
Arthritis (Osteoarthritis, Gout Arthritis, Unspecified Arthritis)	10 (30.3%)
Gastrointestinal disease (GERD, Gastritis, and Erosive Gastropathy)	5 (15.1%)
Benign prostate hyperplasia	4 (33.3%)

Table 3. Characteristics of anemia by age group and gender

	Microcytic Anemia	Normocytic Anemia
Age Group		
≤ 65 y.o	2 (6%)	22 (66.7%)
> 65 y.o	5 (15.2%)	4 (12.1%)
Gender		
Male	4 (12.1%)	8 (24.3%)
Female	3 (9%)	18 (54.6%)

There are several prevalence studies related to anemia in geriatrics. A study in Turkey showed that among 7.3% of patients with anemia, hypochromic microcytic anemia was the most commonly found, followed by normochromic normocytic anemia. However, macrocytic anemia was not found in the population.[15] A study in India showed that among 105 patients with anemia, normochromic normocytic anemia was the most common type of anemia encountered, followed by hypochromic microcytic and macrocytic anemia. A study in Italy showed that among anemic patients, 72.3% had normochromic normocytic, followed by hypochromic microcytic anemia, which was consistent with this study's findings.[16] These comparisons were shown in Table 4.

In this study, several comorbidities were found, for instance, hypertension, arthritis, gastrointestinal disease, and benign prostate hyperplasia as shown in Table 1. Anemia was linked to various effects on body function and comorbidity including the immune system, metabolism, cognition, renal failure, chronic inflammation, as well as a higher risk of cardiovascular-related diseases such as hypertension and ischemic heart disease. It might be associated with a proinflammatory state and increased oxidative stress in anemia patients, especially in iron deficiency.[17] Elderly especially those aged > 65 years old had an increasing prevalence of anemia. However, in our study, the < 65 years old population had shown a higher prevalence of anemia compared to the > 65 years old, it demonstrated that patients with age > 59 years were already prone to anemia. Further studies are needed

Table 4. Characteristic of anemia: comparison of different studies

	Halawi *et al.* 2017[17]	Sharma *et al.* 2015	Yildirim *et al.* 2015	This Study 2021
Prevalence of anemia among all subject	All patients are anemia	All patients are anemia	7.3%	13.64%
Normochromic normocytic anemia	72.3%	53.3%	28.3%	78.8%
Microcytic hypochromic anemia	16.9%	40%	50%	21.2%
Macrocytic anemia	N/A	6.6%	N/A	N/A

to evaluate regarding nutritional, socioeconomic, occupational, and other factors.

The limitation of this study was the etiology of anemia could not be specified. The complete lab hematological examination, bone marrow aspiration, nutritional status, stool and urine analysis, renal function tests including blood urea and serum creatinine, and additional investigations or diagnostic procedures (including radiological imaging, gastrointestinal endoscopy, tissue biopsy, stool analysis, etc.) needed to be analyzed to determine the exact cause of anemia in future studies.

In conclusion, geriatrics are prone to anemia. Microcytic hypochromic and normocytic normochromic anemia are the most common type of anemia identified in geriatrics and anemia is more commonly found in males than females.

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