

Evaluation of Anemia in Geriatric Patients Treated at Bingöl State Hospital in 2017

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article is retained by the author(s).**ABSTRACT**

Anemia is a worldwide health problem. The aim of the study was to determine how anemia was affected by sociodemographic characteristics and factors such as treatment in hospital, and to evaluate anemia according to morphological, age groups and anemia severity level in individuals with anemia. The study was conducted retrospectively in geriatric patients admitted to Bingöl State Hospital. The incidence of anemia was determined in both inpatients and outpatients, and in men and women. Patients with anemia were classified morphologically. Anemic patients were divided into severe, moderate and mild anemia. A total of 11621 patients were included, of whom 6292 were women and 5329 were men. Among them, 2142 (18.43%) were inpatients and 9,479 (81.57%) were outpatients. The overall prevalence of anemia was 24.71%, with rates of 21.72% in women and 28.25% in men. Anemia was more common in inpatients (46.51%) compared to outpatients (19.79%). The highest prevalence was observed in male inpatients, particularly those aged 85 years and older (67.35%). Anemia severity was classified as mild in 73.23% of patients, moderate in 19.62%, and severe in 7.15%. Morphologically, normocytic anemia was the most common (74.21%), followed by microcytic (21.59%) and macrocytic anemia (4.22%). Results revealed that anemia prevalence increased with advancing age (65–74, 75–84, and ≥85) ($p < 0.05$). Overall, anemia was more frequent in men and in hospitalized patients. These findings highlight the importance of early detection and management of anemia in the elderly.

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INTRODUCTION

Advances in modern medicine have led to a significant increase in life expectancy, resulting in a growing proportion of older individuals within the population. Consequently, aging has become a multidisciplinary field of research attracting the attention of various scientific disciplines. While the pathology of aging is primarily addressed within the field of geriatrics, physiological or normal aging processes are studied within the discipline of gerontology [1]. Although old age is generally defined as 65 years and older, it can be further categorized into stages: early old age (65–74 years), old age (75–84 years), and advanced old age (85 years and older) [2].

The proportion of the geriatric population is steadily increasing both worldwide and in Türkiye. According to data from the five-year period between 2019 and 2024, the population aged 65 years and over in Türkiye increased by 20.7%, reaching 9,112,298 individuals [3]. It is well known that the number of elderly women exceeds that of men in the older population. When elderly individuals are evaluated by age groups, 63.4% were in the 65–74 age group, 28.8% were in the 75–84 age group, and 7.8% were aged 85 years and older in 2024 [3]. Older adults frequently experience various health problems, and compared with younger individuals, these conditions may present higher morbidity and mortality [4]. Anemia is one such condition.

Anemia is defined as a decrease in hemoglobin concentration or hematocrit below the expected reference values. According to the World Health Organization [5], anemia in adults is defined as a hemoglobin level below 12 g/dL in women and below 13 g/dL in men [5]. Various etiopathogenetic classifications of anemia have been described in the literature [6]. In general, anemia may result from blood loss, decreased erythrocyte production, or increased erythrocyte destruction [7]. Morphological classification of anemia is based on parameters such as cell shape, size, and color [8]. According to this classification, anemias are categorized as normocytic (mean corpuscular volume [MCV] 80–100 fL), microcytic (MCV <80 fL), or macrocytic (MCV >100 fL) [9].

In addition to decreases in hemoglobin concentration, erythrocyte count, and hematocrit levels, further diagnostic methods such as bone marrow examination and peripheral blood smear analysis can be used to determine the type of anemia and to evaluate erythrocyte morphology [10]. Among older adults, anemia related to nutritional deficiencies and malabsorption, particularly vitamin B12 and folic acid deficiency, is commonly observed [11]. Important mechanisms contributing to anemia of chronic disease include

shortened erythrocyte lifespan/hemolysis, decreased iron absorption in the gastrointestinal tract, and a reduced bone marrow response to anemia [12].

While iron deficiency is commonly observed in nutrition-related anemias, vitamin B12 and folic acid deficiencies are also present in approximately 20% of these individuals [13]. The development of additional health complications associated with anemia in older adults represents a significant clinical concern [14]. Therefore, determining the prevalence and characteristics of anemia among elderly individuals according to age categories constitutes an important source of information for guiding healthcare practices and for developing preventive strategies aimed at maintaining health in the aging population. This study was conducted to contribute to the literature from this perspective to evaluate the presence of anemia from local hospital based data.

METHODS

Patients aged 65 years and older who were admitted to Bingöl State Hospital between January 1, 2017, and December 31, 2017, were included in this study. A total of 11621 patients were identified. Among them, 2142 patients were hospitalized (inpatients), and 9479 patients were treated on an outpatient basis. The study population consisted of 6292 females (954 inpatients and 5338 outpatients) and 5329 males (1188 inpatients and 4141 outpatients).

The data source of the study consisted of retrospectively obtained hospital records. Complete records from the hospital are evaluated for the patients. From these records, the following hematological parameters were retrieved: erythrocyte count (RBC), hemoglobin (HGB), hematocrit (HCT), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and red cell distribution width (RDW). The data were evaluated separately according to sex (male/female) and treatment status (inpatient/outpatient).

Among hospitalized individuals, RBC values were available for 2142 patients, HGB for 2137, HCT for 2133, MCV for 2138, MCH for 2135, and RDW for 2124. Among outpatients, RBC values were available for 9479 patients, HGB for 9473, HCT for 9469, MCV for 9470, MCH for 9470, and RDW for 9414 individuals. The percentages for each parameter were calculated based on the number of individuals for whom the relevant measurement was available.

Anemia was defined as a hemoglobin level below 12 g/dL in women and below 13 g/dL in men [12]. In addition, all patients identified as anemic based on hemoglobin levels were further categorized according to MCV values. Accordingly, patients were grouped by sex and treatment status

(inpatient/clinical vs outpatient/polyclinic), and the morphological distribution of anemia was determined. Based on MCV values, individuals were classified as microcytic anemia (MCV <80 fL), normocytic anemia (MCV 80–99 fL), or macrocytic anemia (MCV ≥100 fL).

Furthermore, patients diagnosed with anemia according to hemoglobin levels were categorized into three age groups: 65–74 years, 75–84 years, and 85 years and older. These groups were again analyzed according to sex and treatment status (inpatient vs outpatient). The prevalence of anemia across different age groups was subsequently evaluated. To determine the severity of anemia, patients were further

classified into mild, moderate, and severe anemia categories. Mild anemia was defined as hemoglobin levels between 10–13 g/dL in men and 10–12 g/dL in women. Patients with hemoglobin levels between 8–10 g/dL were classified as having moderate anemia, whereas those with hemoglobin levels below 8 g/dL were classified as having severe anemia. Ethical approval for the study was obtained from the Bingöl Provincial Health Directorate Ethics Committee (decision dated 02.01.2019).

Table 1. Sex distribution of geriatric individuals

		Female	Male	Total
Hospitalized Patients	Percent (%)	15.16	22.29	18.43
	Individual (N)	954	1188	2142
Outpatient Patients	Percent (%)	84.84	77.71	81.57
	Individual (N)	5338	4141	9479
Total	Percent (%)	54.14	45.86	100
	Individual (N)	6292	5329	11621

Table 2. Descriptive findings in patients hospitalized or outpatients according to sex.

Inpatient								
	Female				Male			
	Mean	S.D.	Min.	Max.	Mean	S.D.	Min.	Max.
Age	76.43	8.07	65	104	75.42	7.25	65	120
Hgb (gr/dl)	11.84	2.17	6.5	17.4	12.68	2.47	6.5	18.8
MCV (fl)	87.03	7.18	52.3	125.6	88.38	7.25	57.1	141.8
Outpatient								
	Female				Male			
	Mean	S.D.	Min.	Max.	Mean	S.D.	Min.	Max.
Age	74.08	7.23	65	119	75.29	6.94	65	120
Hgb (gr/dl)	13.23	1.59	6.5	19.9	14.15	2.03	5	19.6
MCV (fl)	87.42	6.22	51.6	127.3	89.07	6.72	55.9	137.8

Statistical Analysis

Continuous variables were expressed as mean, standard deviation, minimum, and maximum values, while categorical variables were presented as numbers and percentages. Comparisons of group means for continuous variables were performed using the Minitab 17 statistical software package and the Z-test for proportions. A p-value <0.05 was considered statistically significant. Microsoft Excel was used for data processing and organization.

(84.84%) of the total female participants were outpatients (**Table 1**). Statistically significant differences were observed between all groups except between outpatient males and outpatient females ($p < 0.05$).

Descriptive findings for hospitalized and outpatient patients according to sex are presented in Table 2. Among hospitalized females, the mean age was 76.43 years, the mean hemoglobin level was 11.84 g/dL, and the mean MCV was 87.03 fL. Among hospitalized males, the mean age was 75.42 years, the mean hemoglobin level was 12.68 g/dL, and the mean MCV was 88.38 fL.

Table 3. Hgb–sex comparison in patients

Hospitalized Anemic Patients		Woman	Male	Total
	Hospitalized patient number (N) whose Hgb was measured	953	1184	2137
	Hospitalized anemia number (N)	426	568	994
	Prevalence of anemia in sex groups according to total hospitalized individual number (%)	%44.70	%47.97	%46.51
	Hospitalized anemic sex ratio (%)	%42.86	%57.14	%100
Outpatient Anemic Patients		Woman	Male	Total
	Number of outpatient patients whose Hgb was measured (N)	5336	4137	9473
	Number of anemia patients receiving outpatient treatment (N)	940	935	1875
	Prevalence of anemia in sex groups according to number of individuals receiving total outpatient treatment (%)	%17.62	%22.60	%19.79
	Percentage of anemia patients of all sexes receiving outpatient treatment (%)	%50.13	%49.87	%100

RESULTS

In this study, the number of patients aged 65 years and older whose hemogram results were evaluated was 11,621. Among them, 2142 patients (18.43%) were hospitalized, while 9479 patients (81.57%) were treated on an outpatient basis. The study population consisted of 6292 females (954 inpatients and 5,338 outpatients) and 5,329 males (1188 inpatients and 4141 outpatients) (**Table 1**).

Among the total male participants, 1188 (22.29%) were hospitalized, whereas 954 (15.16%) of the total female participants were hospitalized. Among the total male participants, 4141 (77.71%) were outpatients, whereas 5338

Among outpatient females, the mean age was 74.08 years, the mean hemoglobin level was 13.23 g/dL, and the mean MCV was 87.42 fL. Among outpatient males, the mean age was 75.29 years, the mean hemoglobin level was 14.15 g/dL, and the mean MCV was 89.07 fL (**Table 2**).

After obtaining all patient findings, the prevalence of anemia among the geriatric population was determined. Among the 11610 individuals whose hemoglobin levels were available, the overall prevalence of anemia was 24.71% (2869 individuals). The prevalence of anemia was 21.72% (1366 individuals) among females and 28.25% (1,503 individuals) among males, indicating a statistically significant difference

between sexes ($p<0.05$).

Among hospitalized patients with available hemoglobin measurements ($n=2137$), 994 individuals were anemic, corresponding to an anemia prevalence of 46.51%. Among outpatients with available hemoglobin measurements ($n=9473$), 1,875 individuals were anemic, corresponding to an anemia prevalence of 19.79%. These findings indicate that anemia was significantly more prevalent among hospitalized patients compared with outpatients ($p<0.05$).

Among the hospitalized patients classified as anemic according to hemoglobin levels ($n=994$), 426 were female and 568 were male. Hemoglobin measurements were available for 1,184 hospitalized male patients, of whom 568 had hemoglobin levels below 13 g/dL and 616 had levels above 13 g/dL, resulting in an anemia prevalence of 47.97% among hospitalized males.

Hemoglobin measurements were available for 953 hospitalized female patients, of whom 426 had hemoglobin levels below 12 g/dL and 527 had levels above 12 g/dL, corresponding to an anemia prevalence of 44.70% among hospitalized females. A statistically significant difference was

observed between hospitalized male and female patients ($p<0.05$).

Among outpatient males ($n=4137$), 935 individuals had hemoglobin levels below 13 g/dL, resulting in an anemia prevalence of 22.60%. Among outpatient females ($n=5336$), 940 individuals had hemoglobin levels below 12 g/dL, corresponding to an anemia prevalence of 17.62%. No statistically significant difference was observed between outpatient male and female patients ($p>0.05$).

Anemia prevalence was higher among hospitalized women (44.70%) compared with outpatient women (17.62%). Similarly, hospitalized men (47.97%) exhibited a higher prevalence of anemia compared with outpatient men (22.57%). These differences were statistically significant ($p<0.05$). Furthermore, anemia prevalence among hospitalized males was significantly higher than among hospitalized females ($p<0.05$) (**Table 3**).

In the next stage of the study, the severity of anemia was classified among the 2,869 individuals identified as anemic. In the overall anemic geriatric population, severe anemia was observed in 7.15% (205 individuals), moderate anemia in

Table 4. Comparison of anemia severity levels in patients.

Sex		Hgb below 8 gr/dl (severe anemia)	Hgb between 8-10gr/dl moderate anemia)	Hgb between 10-13 gr/dl (mild anemia)
Male Hospitalized	Number (N)	59	136	373
	Mean Hgb value (gr/dl)	7.35±0.43	9.05±0.51	11.67±0.84
Male Outpatient	Number (N)	46	134	755
	Mean Hgb value (gr/dl)	7.20±0.58	9.11±0.52	11.85±0.81
Total	Number (N)	105	270	1128
Sex		Hgb below 8 gr/dl (severe anemia)	Hgb between 8-10 gr/dl (moderate anemia)	Hgb between 10-13 gr/dl (mild anemia)
Woman Hospitalized	Number (N)	65	132	229
	Mean Hgb value (gr/dl)	7.28±0.45	9.07±0.60	11.06±0.56
Woman Outpatient	Number (N)	35	161	744
	Mean Hgb value (gr/dl)	7.19±0.45	9.17±0.45	11.18±0.55
Total	Number (N)	100	293	973

19.62% (563 individuals), and mild anemia in 73.23% (2,101 individuals). Among anemic male patients, 59 hospitalized males (10.39%) had severe anemia, 136 (23.94%) had moderate anemia, and 373 (65.67%) had mild anemia. Among outpatient males, 46 individuals (4.92%) had severe anemia, 134 (14.33%) had moderate anemia, and 755 (80.75%) had mild anemia. Overall, among anemic male patients, 6.99% had severe anemia, 17.96% had moderate anemia, and 75.05% had mild anemia.

The mean hemoglobin levels among hospitalized males were 7.35 ± 0.43 g/dL in severe anemia, 9.05 ± 0.51 g/dL in moderate anemia, and 11.67 ± 0.84 g/dL in mild anemia. Among outpatient males, the corresponding values were 7.20 ± 0.58 g/dL, 9.11 ± 0.52 g/dL, and 11.85 ± 0.81 g/dL,

respectively. Among female patients, 65 hospitalized women (15.26%) had severe anemia, 132 (30.99%) had moderate anemia, and 229 (53.76%) had mild anemia. Among outpatient women, 35 (3.72%) had severe anemia, 161 (17.13%) had moderate anemia, and 744 (79.15%) had mild anemia. Overall, among anemic female patients, 7.32% had severe anemia, 21.45% had moderate anemia, and 71.23% had mild anemia. The mean hemoglobin levels among hospitalized females were 7.28 ± 0.45 g/dL in severe anemia, 9.07 ± 0.60 g/dL in moderate anemia, and 11.06 ± 0.56 g/dL in mild anemia. Among outpatient females, the corresponding values were 7.19 ± 0.45 g/dL, 9.17 ± 0.45 g/dL, and 11.18 ± 0.55 g/dL, respectively (Table 4).

Another analysis performed in this study evaluated the

Table 5. Sex-Age Comparison of Anemia in Geriatric Patients

Sex	Individual number and rates of anemia according to age range.	Hospitalized	Outpatient	Total
Male geriatric Patients	Between 65-74 Male number (N)	239	397	636
	Between 65-74 anemic Male (%)	39.97	16.87	21.55
	Between 75-84 anemic Male number (N)	230	380	610
	Between 75-84 anemic Male (%)	52.39	27.07	33.10
	85 and above anemic Male number (N)	99	158	257
	85 and above anemic Male (%)	67.35	41.58	48.77
	Total measurable anemic male number (N) according to Hgb	568	935	1503
	Total measurable Male number (N) according to Hgb	1184	4137	5321
Woman geriatric Patients	Between 65-74 anemic woman number (N)	170	483	653
	Between 65-74 anemic woman (%)	38.29	15.15	17.98
	Between 75-84 anemic woman number (N)	160	326	486
	Between 75-84 anemic woman (%)	48.34	20.40	25.19
	85 and above anemic woman number (N)	96	131	227
	85 and above anemic woman (%)	53.93	23.82	31.18
	Total measurable anemic woman number (N) according to Hgb	426	940	1366
	Total measurable number of women (N) according to Hgb	953	5336	6289

distribution of anemia across age groups. Among male patients, anemia prevalence was 21.55% in the 65–74 age group, 33.10% in the 75–84 age group, and 48.77% in individuals aged ≥ 85 years. Among female patients, anemia prevalence was 17.98% in the 65–74 age group, 25.19% in the 75–84 age group, and 31.18% in individuals aged ≥ 85 years. These findings indicate a statistically significant increase in anemia prevalence with advancing age ($p < 0.05$) (**Table 5**).

Finally, anemic patients were classified according to erythrocyte morphology based on MCV values. Among hospitalized male patients, 16.02% had microcytic anemia, 80.11% had normocytic anemia, and 3.87% had macrocytic

Overall, in the total anemic geriatric population, normocytic anemia was the most common type (74.21%, $n=2,129$), followed by microcytic anemia (21.58%, $n=619$), while macrocytic anemia was the least common type (4.22%, $n=121$). In the comparison between groups, a statistically significant difference was observed only between hospitalized males and outpatient females in the microcytic anemia category ($p < 0.05$). No significant difference was observed in the normocytic anemia category, while in the macrocytic anemia category, a significant difference was observed only between hospitalized females and outpatient females ($p < 0.05$) (**Table 6**).

Table 6. Morphological comparison of anemic patients based on MCV results

Sex		Microcytic Anemia	Normocytic Anemia	Macrocytic Anemia	Total
Male Hospitalized	Percent (%)	16.02	80.11	3.87	% 100
	Individual (N)	91	455	22	568
	Mean MCV value	73.07 $\pm$ 5.85	88.81 $\pm$ 4.56	107.41 $\pm$ 9.38	
Male Outpatient	Percent (%)	20	75.08	4.92	% 100
	Individual (N)	187	702	46	935
	Mean MCV value	71.90 $\pm$ 5.75	89.39 $\pm$ 4.94	107.86 $\pm$ 8.68	
Woman Hospitalized	Percent (%)	20.89	74.65	4.46	% 100
	Individual (N)	89	318	19	426
	Mean MCV value	72.85 $\pm$ 8.96	88.12 $\pm$ 4.74	107.87 $\pm$ 9.26	
Woman Outpatient	Percent (%)	26.81	69.57	3.62	% 100
	Individual (N)	252	654	34	940
	Mean MCV value	72.85 $\pm$ 5.96	88.09 $\pm$ 4.93	108.13 $\pm$ 8.15	
Total	Individual (N)	619	2129	121	2869
Total	Percent (%)	21.58	74.21	4.22	% 100

anemia. Among outpatient males, 20% had microcytic, 75.08% had normocytic, and 4.92% had macrocytic anemia. Among hospitalized female patients, 20.89% had microcytic, 74.65% had normocytic, and 4.46% had macrocytic anemia. Among outpatient females, 26.81% had microcytic, 69.57% had normocytic, and 3.62% had macrocytic anemia.

DISCUSSION

The present study aimed to evaluate the prevalence and characteristics of anemia among geriatric patients who were admitted to Bingol State Hospital in 2017. Specifically, the study investigated how anemia was associated with sociodemographic characteristics (sex and age) and treatment

status (inpatient vs. outpatient). In addition, the morphological classification of anemia, its distribution across age groups, and the severity of anemia among affected individuals were examined.

Anemia is a common clinical problem in the elderly population. Its prevalence increases with age and, depending on its severity, may lead to increased morbidity and mortality as well as a decline in quality of life. With the increase in life expectancy, the proportion of the elderly population in society is steadily rising, and consequently the prevalence of anemia is expected to increase in the coming years [12]. Anemia in individuals aged 65 years and older has been associated with several adverse outcomes, including decreased physical performance, reduced quality of life, impaired cognitive function, and depression [15].

In particular, the prevalence of anemia appears to be considerably higher among hospitalized patients. Several factors may contribute to this finding, including the higher prevalence of chronic diseases in the elderly, low socioeconomic status, inadequate or unbalanced nutrition, and poor dietary habits. The increasing prevalence of chronic diseases with advancing age and their higher frequency among hospitalized patients may also be important contributing factors [16].

An increase in the frequency of anemia and related health problems has been reported with advancing age [17]. In a study investigating the association between anemia, hospitalization, and mortality among elderly individuals, 17030 patients aged over 66 years were followed for three years. Among anemic patients with normal renal function, mortality, all-cause hospitalization, and first hospitalization due to cardiovascular events were found to be higher compared with non-anemic individuals. In that study, the lowest mortality rates were observed at hemoglobin levels of 14–17 g/dL in men and 13–15 g/dL in women [18].

The reported prevalence of anemia in elderly populations varies considerably depending on factors such as the study setting (community, nursing home, hospital, or outpatient clinic), the health status of participants, and the diagnostic criteria used for anemia. Previous studies have reported anemia prevalence ranging from 2.9% to 61% in men and from 3.3% to 41% in women [19]. As societies continue to age, an increase in anemia prevalence is expected. The prevalence of anemia is particularly high among individuals living in nursing homes, those of advanced age, and hospitalized patients [20].

Among hospitalized elderly patients, the causes of anemia have been reported as follows: chronic diseases (35%), unexplained causes (17%), iron deficiency (15%), bleeding

(7%), renal, hepatic, or endocrine disorders (6.5%), myelodysplasia or acute leukemia (5.5%), chronic leukemia or lymphoma (5.5%), vitamin B12 or folate deficiency (5.5%), and other hematological disorders (3%) [21].

In a study conducted at Sakarya University Training and Research Hospital in 2011 including 316 hospitalized individuals aged 65 years and older, anemia was the most common diagnosis, with a prevalence of 60% [22]. In our study, the prevalence of anemia among hospitalized patients was 46.51%, whereas it was 19.79% among outpatients, confirming that anemia is considerably more common among hospitalized elderly individuals.

Previous studies have also reported high anemia prevalence among hospitalized elderly populations. For example, Beghe et al. [23] reported anemia in 61% of hospitalized elderly patients, while a study conducted in Germany found anemia prevalence rates of 20% in the community and 40% among hospitalized elderly individuals [24]. Sezer et al. [25] reported anemia prevalence of 76% among hospitalized patients aged 65 years and older, with rates of 69.9% in women and 83.5% in men. Similarly, a study conducted at Ege University Medical Faculty Hospital reported an anemia prevalence of 83.8% among hospitalized elderly patients, with rates of 87.1% in men and 80.9% in women [26]. Consistent with these findings, our study also demonstrated a higher prevalence of anemia among hospitalized patients, particularly among males.

Among elderly individuals followed in outpatient settings, the causes of anemia have been reported as chronic diseases (17%), unexplained causes (36%), iron deficiency (8%), renal or hepatic insufficiency and endocrine disorders (8%), hematological diseases (8%), and infections (23%) [27]. In a study conducted at Harran University, anemia of chronic disease was identified in 36% of individuals aged 65 years and older [28]. Another study conducted in Antalya reported an anemia prevalence of 30.5% among 2,100 elderly individuals attending an internal medicine outpatient clinic [29]. Similarly, Erkan et al. [30] reported anemia in 32.5% of patients aged 65 years and older attending outpatient clinics. In our study, anemia prevalence among outpatients was 19.79%, with rates of 17.62% in women and 22.57% in men.

Consistent with previous studies, the prevalence of anemia in our study increased with advancing age. The highest prevalence was observed in patients aged 85 years and older. Similar findings have been reported in previous studies, which demonstrated a progressive increase in anemia prevalence across age groups [30,12].

In the present study, anemia was also classified

morphologically according to mean corpuscular volume (MCV). Normocytic anemia was the most common morphological type, followed by microcytic anemia, whereas macrocytic anemia was the least common. Similar findings have been reported in previous studies. For example, Şimşek [12] reported normocytic anemia in 72.1% of cases, while Yıldızhan [31] found normocytic anemia in 68% of anemic elderly patients.

Microcytic anemia was the second most common type in our study (21.58%). Previous studies have reported similar findings, with microcytic anemia prevalence of 19.4% [12]. Iron deficiency anemia is one of the most common causes of nutritional anemia in elderly individuals and is frequently associated with gastrointestinal blood loss [32]. Therefore, when microcytic anemia is detected in elderly patients, evaluation for iron deficiency and possible underlying malignancies should be considered.

Macrocytic anemia was the least common type in our study (4.22%). Similar prevalence rates have been reported in previous studies, such as 5.8% in Guralnik et al., 8.5% in Şimşek's study, and 1% in Yıldızhan's study [32,12,31]. Macrocytic anemia in elderly individuals is commonly associated with vitamin B12 and folate deficiencies, which impair DNA synthesis and reduce the production of hematopoietic precursors. Identification of nutritional deficiencies in geriatric patients is important because treatment is relatively simple and cost-effective, and may also prevent other complications associated with these deficiencies [32].

It has long been recognized that anemia is associated with reduced survival among elderly individuals [33]. The risk of mortality generally increases with the increasing severity of anemia. However, this increased risk may not be solely due to anemia itself but may also reflect underlying serious diseases [14]. In our study, mild anemia was the most common severity category, consistent with findings from previous studies.

Our findings also indicated that anemia was more prevalent among male patients than female patients, which is consistent with several studies conducted in Türkiye [34,31,12]. This difference may partly be explained by the absence of menstrual blood loss in postmenopausal women and by the higher diagnostic hemoglobin threshold for anemia in men (13 g/dL) compared with women (12 g/dL).

Limitations of the Study

This study was a retrospective evaluation based on a single center without any information about the etiology.

CONCLUSION

In conclusion, the prevalence of anemia among individuals aged 65 years and older in Bingol was found to be relatively high. Anemia was more common among male patients than female patients, and its prevalence increased with advancing age, with the highest rates observed in individuals aged 85 years and older.

Regarding severity, mild anemia was the most common form, followed by moderate anemia, whereas severe anemia (Hgb <8 g/dL) was the least common. Hospitalized patients had a higher prevalence of anemia compared with outpatients, suggesting that hospitalization may represent an important risk factor for anemia among elderly individuals.

Morphological classification revealed that normocytic anemia was the most frequent type, followed by microcytic anemia, while macrocytic anemia was the least common.

The findings of this study may contribute to the development of public health programs aimed at preventing anemia in elderly populations. Future studies should investigate the underlying causes of anemia among hospitalized elderly patients in greater detail and develop strategies for its prevention and management. In addition, large-scale studies focusing on the etiology of anemia in geriatric populations are recommended.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper and that they have approved the final version.

Disclosure

The authors have reported no conflicts of interest in preparing and publishing this article.

Ethics Committee Approval

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