CLINICAL PROFILE OF PATIENTS WITH ANEMIA IN A TERTIARY CARE HOSPITAL

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ABSTRACT

INTRODUCTION

Anemia is a common health problem with nonspecific symptoms often overlooked leading to adverse health outcomes. This study aims to assess the clinical profile, types, and etiologies of anemia.

MATERIAL AND METHODS

In this hospital based cross-sectional study, patients with anemia were enrolled through convenience sampling. Relevant history, physical examination, and investigations were performed. Statistical package for social sciences software version 20 was used to enter and analyze the data. Categorical variables were expressed as frequencies and percentages. Continuous variables were expressed as median (range). The associations were analyzed by using Fisher's exact test or Chi-square test, as appropriate.

RESULTS

Out of 193 patients, 151 (78.2%) were females. The median age was 49 years (range 18-87 years). Most frequent symptoms were easy fatiguability (76.2%), breathlessness on exertion (30.1%), and light headedness (21.8%). Most frequent signs were pallor (75.6%), tachycardia (23.8%), glossitis (16.1%), and nail changes (15.5%). Majority (79.3%) had moderate and 17.1% had severe anemia. Iron deficiency (59.1%) and anemia of inflammation (28%) were common etiologies. Iron deficiency anemia was most commonly due to nutritional deficiency. Age was significantly associated with the type and etiology of anemia.

CONCLUSION

Moderate anemia was the most common presentation. Easy fatiguability, breathlessness on exertion, and light headedness were most common symptoms, while pallor, tachycardia, glossitis, and nail changes were the most common signs. Iron deficiency anemia and anemia of inflammation were most common etiologies. Iron deficiency anemia was more common in younger patients, while anemia of inflammation was more common in older patients.

KEYWORDS

Anemia, Fatiguability, Iron, Pallor, Nepal

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INTRODUCTION

Anemia is a clinical state in which the quantity or quality of circulating red blood cells, hemoglobin, or hematocrit level is reduced below the reference range for healthy individuals of the same age, sex, and race, under similar environmental conditions.[1] The World Health Organization defines anemia as a hemoglobin level of less than 13g/dl in adult males, less than 12 g/dl in adult females, and less than 11g/dl in pregnant women.[2]

Anemia is a significant public health problem in developing countries.[3] Approximately one-third of the population is affected by anemia globally.[4,5] South and Southeast Asian countries account for the largest burden of anemia.[6] One study reported that more than 40% of women of reproductive age in Nepal are anemic.[7] Another study from Nepal reported the presence of anemia in about 37.8% of undergraduate health science students.[1]

Anemia reduces the oxygen-carrying capacity of the blood leading to tissue hypoxia. It is associated with several adverse health consequences. Anemia is not a disease in itself but a manifestation of some other underlying problems. The symptoms of anemia such as easy fatigability and weakness are usually neglected by patients. Failure to evaluate anemia could lead to delayed diagnosis of potentially treatable conditions. So, it is very important to diagnose the cause of anemia. This research aims to assess the clinical profile, types, and etiologies of anemia in patients visiting a teaching hospital in Nepal.

MATERIAL AND METHODS

The present study was a hospital based observational cross-sectional study. Patients diagnosed with anemia were selected from medicine outpatient department and medical ward of Devdaha Medical College and Research Institute from July 1, 2022 to Sep 30, 2022. Anemia was diagnosed according to WHO definition of Hemoglobin level < 13 g/dl in men and < 12 g/dl in women. Anemia severity was categorized into mild, moderate, and severe according to WHO criteria.[2]

Mild: Hemoglobin level 11-11.9 g/dl in women and 11-12.9 g/dl in men

Moderate: Hemoglobin level 8-10.9 g/dl in both sexes
Severe: Hemoglobin level < 8 g/dl in both sexes
Patients satisfying the following eligibility criteria were selected for the study.

Inclusion Criteria:
• Age >/= 18 years
• Sex: Both males and females
• Hb < 13 g/dl in men and Hb < 12 g/dl in women
• Giving informed consent
• Patients completing the necessary investigations for the evaluation of anemia

Exclusion Criteria:
• Patient on chemotherapy for malignancies
• Anemia due to acute blood loss
• Pregnant women
• Patients who received blood transfusion in last three months
• History of recent major surgical interventions

For sample size estimation, finite population correction was applied to the sample size formula, i.e.,
$$n = NX/(X + N − 1)$$
$$X = Z^2P(1 − P)/D^2$$
where,
n = Sample size for finite population
X = Sample size for infinite population
Z = Critical value of the normal distribution for the assumed level of confidence
P = Estimated proportion of parameter of interest i.e., the prevalence of anemia
D = Assumed percentage for margin of error
N = Estimated population size, i.e., approximate frequency of anemia patients attending the hospital during the study period

A 41% prevalence for anemia[8], a 95% level of confidence, a 5% margin of error, and an estimated population size of 400, were considered in calculating the sample size, establishing a minimum sample of 193.

Non-probability, convenience sampling technique was used to enroll the participants. Data was collected using preformed proforma. Relevant history, physical examination, and investigations were performed on eligible patients.

Following investigations were performed for all patients.
• Complete blood counts
• Red blood cell indices
• Serum creatinine
• Reticulocyte count
• Peripheral blood smear
• Stool routine examination
• Stool for occult blood

Other investigations were performed as indicated. Anemia was classified into different pathological types based on peripheral blood smear findings. Final etiological diagnosis of anemia was made by consultant physician.

Statistical package for social sciences (SPSS) software version 20 was used to enter and analyze the data. Both descriptive and inferential statistics were used for analysis. Continuous variables were summarized by mean (standard deviation) or median (range), depending on whether the data were normally distributed.

Categorical variables were expressed as frequencies and percentages. Patients were divided into three age groups: early adulthood (18-39 years), middle adulthood (40-59 years), and old age (60 years and above) to study the association with type, severity, and etiology of anemia.[9] The associations were analyzed using Fisher's exact test or Pearson's chi-square test, as appropriate. All statistical analyses were 2 tailed and p-value of <0.05 was considered to be statistically significant. Ethical approval was obtained from the Institutional Review Committee of Devdaha Medical College. (Reference number: 770/078/079)

RESULTS

A total of 193 patients with anemia were involved in this study. The median age was 49 years (range 18-87 years). 66 patients (34.2%) were in old age, 65 (33.7%) in middle adulthood, and 62 patients (32.1%) belonged to early adulthood. 151 (78.2%) patients were females.

Approximately one quarter (22.8 %) were asymptomatic. Common symptoms reported were easy fatiguability (76.2%), breathlessness on exertion (30.1%), and light headedness (21.8%). Other symptoms were as shown in Table 1. Common signs were pallor (75.6%), tachycardia (23.8%), glossitis (16.1%), and platynychia/koilonychia (15.5%). Other signs were as shown in Table 1.

Most of the patients (95.9%) had anemia only, while 5 (2.6%) patients had bicytopenia and 3 (1.6%) patients had pancytopenia. (Table 2) Majority of patients (79.3%) had moderate grade of anemia, while 17.1% had severe anemia. (Table 2) Peripheral blood smear showed microcytic picture in 50.3%, normocytic in 42%, macrocytic in 4.7%, and dimorphic in 3.1%. (Table 2)

The most common etiologies were iron deficiency (59.1%) and anemia of inflammation (28%). Others were as shown in Table 2. Nutritional deficiency (65.79%) was the most common cause of iron deficiency anemia, followed by heavy menstrual bleeding (12.28%) and peptic ulcer disease (11.40%). Other causes were as shown in Figure1.

There was no statistically significant association between gender and the type, severity, or etiology of anemia. (Table 3) Age was significantly associated with the type and etiology, but not with severity of anemia. Microcytic anemia was more common in younger patients, while normocytic anemia was more common in older patients. Similarly, iron deficiency anemia was more common in younger patients, while anemia of inflammation was more common in older patients. (Table 4)

Table 1. Clinical features

Symptoms	Frequency	Percentage
Easy fatigability	147	76.2
Breathlessness on exertion	58	30.1
Light headedness	42	21.8
Limb swelling	20	10.4
Palpitation	19	9.8
Paresthesia	8	4.1
Yellowish discoloration of eyes	4	2.1
Asymptomatic	44	22.8
Signs		
Pallor	146	75.6
Tachycardia	46	23.8
Glossitis	31	16.1
Platynychia/koilonychia	30	15.5
Pedal edema	26	13.5
Systolic flow murmur	23	11.9
Angular cheilosis	19	9.8
Icterus	5	2.6
Splenomegaly	4	2.1

Table 2. Hematologocal features

Variables	Frequency	Percentage
Cytopenia		
Anemia only	185	95.9
Bicytopenia	5	2.6
Pancytopenia	3	1.6
Anemia severity		
Mild	7	3.6
Moderate	153	79.3
Severe	33	17.1
Peripheral blood smear		
Microcytic hypochromic	97	50.3
Normocytic normochromic	81	42
Macrocytic	9	4.7
Dimorphic	6	3.1
Etiology		
Iron deficiency anemia	114	59.1
Anemia of inflammation	54	28
Megaloblastic anemia	9	4.7
Iron and B12 deficiency	6	3.1
Sickle cell disease	3	1.6
Hemolytic anemia	2	1
Thalassemia	2	1
Sickle cell with thalassemia	2	1
Acute leukemia	1	0.5

Figure 1. Etiology of iron deficiency anemia
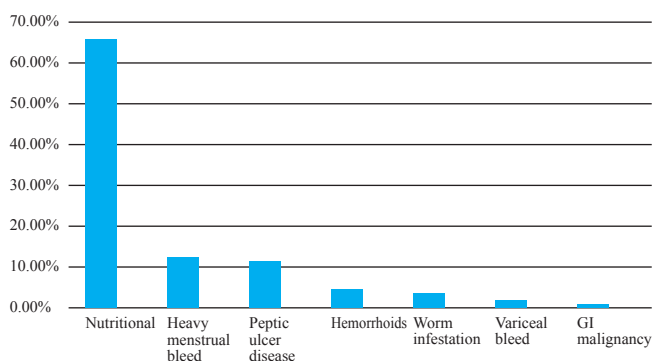
Table 3. Association of gender with type, severity, and etiology of anemia

Variables	Male	Female	Total	X^2, p-value
Type				
Microcytic	15	82	97	X^2=6.441
Normocytic	22	59	81	p-value=0.072
Macrocytic	4	5	9	
Dimorphic	1	5	6	
Severity				
Mild	2	5	7	X^2=0.200
Moderate	33	120	153	p-value=0.905
Severe	7	26	33	
Etiology				
Iron deficiency anemia	18	96	114	X^2=11.781
Anemia of inflammation	18	36	54	p-value=0.098
Megaloblastic anemia	4	5	9	
Iron and B12 deficiency	1	5	6	
Sickle cell disease	0	3	3	
Hemolytic anemia	0	2	2	
Thalassemia	1	1	2	
Sickle cell with thalassemia	0	2	2	
Acute leukemia	0	1	1	

Table 4. Association of age with type, severity, and etiology of anemia

Variables	18-39 years	40-59 years	60 years and above	Total	X^2, p-value
Type					
Microcytic	38	38	21	97	X^2=16.021
Normocytic	21	23	37	81	p-value<0.05
Macrocytic	3	2	4	9	
Dimorphic	0	2	4	6	
Severity					
Mild	3	1	3	7	X^2=2.184
Moderate	47	52	54	153	p-value=0.721
Severe	12	12	9	33	
Etiology					
Iron deficiency anemia	47	43	24	114	X^2=54.575
Anemia of inflammation	3	17	34	54	p-value<0.05
Megaloblastic anemia	3	2	4	9	
Iron and B12 deficiency	0	2	4	6	
Sickle cell disease	3	0	0	3	
Hemolytic anemia	1	1	0	2	
Thalassemia	2	0	0	2	
Sickle cell with thalassemia	2	0	0	2	
Acute leukemia	1	0	0	1	

DISCUSSION

The median age of our study participants was 49 years (range 18-87 years) which is similar to a study done in India (mean 44.86 ± 15.7 years, range 21-74 years).[10] We had almost equal proportion of patients in different age groups. (Old age 34.2%, middle adulthood 33.7%, and early adulthood 32.1%) In contrast, the studies done by Ratre BK et al[11], Kundu et al[12], Fatima SH et al[13], and Patel S[14] involved a higher proportion of younger patients.

In our study, majority (78.2%) were females. This is consistent with many previous studies which have also shown a female predominance.[10,12–16] However, some studies have reported a male preponderance.[11,17] Women are more prone to anemia compared to men due to menstrual blood loss and childbearing. In addition, in South Asia, gender inequality and its consequences, particularly lack of control by women over their lives, can be an important underlying determinant of malnutrition and access to iron-rich foods.[18]

In the present study, most frequent symptoms were easy fatiguability (76.2%), breathlessness on exertion (30.1%), and light headedness (21.8%). Similar findings were reported in studies conducted by Ratre BK et al[11] (weakness and easy fatigability 100%, decreased work performance 80%, breathlessness on exertion 60%), Chandurkar M et al,[15] (easy fatigability 80%, breathlessness 76%) and Patel S[14] (easy fatiguability and generalized weakness and breathlessness were the most common symptoms). In contrast, in study conducted by Sangare Drissa et al[16], main clinical manifestations were vertigo (56.85%), physical asthenia (55.33%), dyspnea (51.26 %), and headaches (50.25%). We found a lower occurrence of swelling of limbs and palpitations (10.4% and 9.8% respectively) in comparison to the findings reported by Chandurkar M et al (40% and 64% respectively)[15]. About a quarter (22.8%) of our patients were asymptomatic while one third (33%) were incidentally detected patients in study done by Kundu et al.[12] These differences in symptoms might be due to variations in participants age and severity of anemia among different studies.

Most frequently noted signs in our study were pallor (75.6%), tachycardia (23.8%), glossitis (16.1%), and platynychia/koilonychia (15.5%) (Table 1) These findings are in accordance with the previous studies, which also reported these signs to be more common.[11,14,15] We noted pedal edema less frequently (13.5%) than in studies done by Ratre BK et al[11] (40%) and Milind Chandurkar et al[15] (40%). Other signs in our study like systolic flow murmur, angular cheilosis, and icterus were less frequently observed compared to study done by Milind Chandurkar et al.[15] These variations in frequency of signs might be due to variations in etiology and severity of anemia among different studies.

Regarding severity of anemia, majority of our patients (79.3%) had moderate anemia, while 17.1% had severe and only 3.6% had mild anemia. Similarly maximum number of moderate anemia was noted in study done by Ratre BK et al[11] (moderate 57%, severe 41%, mild 2%) and Fatima SH et al[13] (moderate 58.6%, mild 36.6%, severe 4.7%). In contrast, maximum number of severe anemia was noted in study done by Karunakar R et al[10] (severe 54.8%, moderate 36.5%, mild 8.7%) and Patel S[14] (severe 85%, moderate 15%). Mild anemia was predominant in study done by Sangare Drissa et al[16] (mild 60.41%, moderate 31.47%, severe 8.12%). These differences in severity might be due to differences in study settings (primary care vs referral center, rural vs urban setting), access to health care, awareness of patients regarding anemia and their health seeking behavior.

Microcytic (50.3%) and normocytic (42%) anemias were the two most common types observed in our study. Other less frequent peripheral smear findings were macrocytic (4.7%) and dimorphic (3.1%). These results are in agreement with findings obtained from previous studies.[13,16,17]

In our study, iron deficiency anemia (59.1%) was the most common etiology, followed by anemia of inflammation (28%). This is consistent with the available literatures.[19,20] Nutritional deficiency is the most common cause of iron deficiency anemia worldwide and other common causes include gastrointestinal bleeding and menstrual blood loss.[21,22] Our findings corroborate these literature.

We found no statistically significant differences between genders in terms of type, severity, or etiology of anemia. However, we observed significant associations between age and the type and etiology of anemia, but not with its severity. Microcytic anemia was more common among younger patients, while normocytic anemia was more commonly observed in older patients. Similarly, iron deficiency anemia was more common among younger patients, whereas anemia of inflammation was more frequent in older patients.

We had few limitations. This is a hospital-based study. So, findings may not accurately reflect anemia in community. Being a single center study, the results cannot be generalized to all the hospitals in Nepal. Response to treatment was not studied. Future research can solve these limitations.

CONCLUSION

Anemia was distributed almost equally across different age groups. The majority of the patients were females and most of the patients presented with moderate severity of anemia. Microcytic and normocytic anemias were the most common

types, and the two most common etiologies were iron deficiency anemia and anemia of inflammation. Nutritional deficiency was the most common etiology for iron deficiency anemia followed by heavy menstrual bleeding and peptic ulcer disease. Easy fatiguability, breathlessness on exertion, and light headedness were most commonly reported symptoms, while pallor, tachycardia, glossitis, and nail changes were the most commonly observed signs. The type, severity, and etiology of anemia were not significantly different between male and female participants. Age showed significant association with the type and etiology of anemia, but not with its severity.

CONFLICT OF INTEREST

None

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