Original Article

Different Causes of Anaemia in Elderly Patients

Causes of Anaemia in Elderly Patients

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ABSTRACT

Objective: To find out the frequency of dissimilar causes of anemia in elderly patients
Study Design: Cross-sectional study
Place and Duration of Study: This study was conducted at the Department of Haematology, Shaikh Zayed Hospital, Lahore from March 2015 to September 2015.
Materials and Methods: A total of 600 cases were enrolled after fulfilling the inclusion criteria. Anemic patients of both genders between 66-86 years were included.
Results: Mean age was 73.14±4.05 years. Male patients were in majority 430(71%). Anemia due to iron insufficiency was found in 178 (29.7%) cases, anemia which was related to megaloblastic cause was noted in 72 (12%) cases, myelodysplastic syndrome related anemia in 56 (9.3%), anemia due to chronic inflammation was found in 150 (25%) of cases, 56 (9.3%) of cases had anemia which was caused by chronic kidney disease, anemia which was linked with endocrinopathy was present in 60 (10%) cases and in 28(4.66%) cases anemia was of unexplained origin.
Conclusion: The majority of the cases had iron insufficiency related anemia in the elderly age. So it is recommended that iron therapy should be given to the elderly patients.
Key Words: Iron deficiency anemia, Megaloblastic anemia, Myelodysplastic syndrome related anemia, Elder patients

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INTRODUCTION

According to world health organization (WHO), anemia in elderly patients is defined as concentration of haemoglobin less than 12g/dl in female gender and less than 13g/dl in male gender.[1] Incidence of the anemia in female and male after age (65 y) was 11% and 10% respectively according to the study of Third National Health and Nutritional Examination Survey (NHANES lll). After 50 years, the prevalence of anemia in elderly increases rapidly. By the age of 84 years or older anemia occurrence rate in elderly reached up to 19.9%.[2]

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Anemia was least common between the age of 50–64 in females while between the age of 17 and 49 years the occurrence in men was lowest, Significantly, in both gender, after the 5th decade of life the incidence of anemia augmented. Although in males age-linked prevalence of anemia was more dramatic. At the age of 75 or older anemia was more frequent in men than in women.[3] This sex disproportion has been examined in other studies as well[4,5] predicted that between the ages 75–84 years, 14.7–16.0% of male and 8.0–11.9% of female had WHO-defined anemia. In the elderly age 85 years and older prevalence rate of anemia was 29.6–30.7% in male gender and 16.5–17.7% in female gender.[6]

Anemia in elderly have numerous etiologies, like anemia due to iron insufficiency (15-23%), anemia due to chronic inflammation (15-35%), anemia related to chronic kidney diseases (8%), endocrinopathies (hypothyroidism) related anemia (<5%), anemia associated with deficiency of vitamin B12 or deficiency of folate (0-14%), anemia due to myelodysplastic syndromes (0-5%) and unexplained anemia (17-45%).[7]

MATERIALS AND METHODS

This cross-sectional study was carried out at Department of Hematology, Shaikh Zayed Hospital Lahore from 15th March 2015 to 14th September 2015. A total of 600 cases were included. Patients of both genders between the age of 66-86 years having anemia were included. Patients with history of iron, vitamin

B12, folate and erythropoietin therapy in last two months and history of blood transfusion in last 30 days were excluded. Complete blood picture (CBC) including Hemoglobin (Hb) and those patients which were found to be anemic were investigated for Mean Corpuscular Volume (MCV) , Mean Corpuscular Hemoglobin (MCH) [using Abacus+ hematological auto analyzer], peripheral smear, and Bone Marrow aspiration (where indicated). Serum Iron, Total Iron binding Capacity (TIBC) ,serum TSH, serum urea and serum creatinine levels were carried out in Biochemistry Laboratory, Shaikh Zayed Hospital [using Dimension RXL auto analyzer]. All this information and the causes of anemia (anemia due to iron insufficiency, anemia related to chronic inflammation ,anemia related to chronic kidney disease, anemia due to endocrinopathies, anemia due to vitamin B12 or folate deficiency, myelodysplastic syndromes related anemia and unexplained anemia) were recorded. The data was analysed using SPSS-20.

RESULTS

The mean age of 73.14±4.05 years were enrolled for this study (Fig. 1). Male patients 430(71%) were in majority as compared to female patients 170 (28.3%). Anemia related to iron insufficiency was present in 178 (29.7%) of cases and was absent in 422 (70.3%) of cases. Anemia due to megaloblastic cause was noted in 72 (12%) of cases and was absent in 528 (88%) of the cases. Anemia related to myelodysplastic syndrome was present in 56 (9.3%) cases while absent in 544 (90.7%) cases. Chronic inflammation related anemia was seen in 150 (25%) of cases while 450 (75%) cases did not have this condition. Chronic kidney disease related Anemia was present in 56 (9.3%) while absent in 544 (90.7%) cases. Anemia related to endocrinopathies was noted in 60 (10%) cases and was not present in 540 (90%) of cases. Anemia due to Unexplained reasons was seen in 28 (4.66%) of cases.

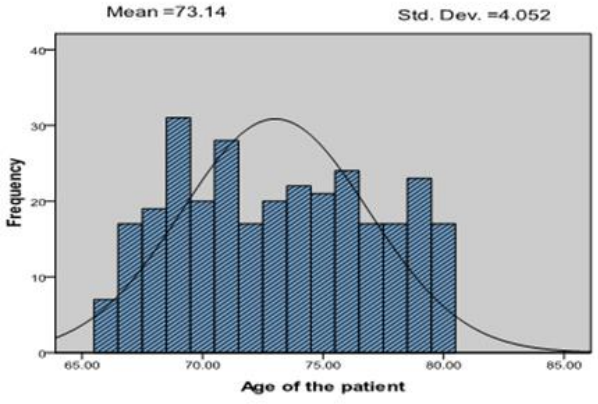

Figure No. 1: Distribution of age

The Prevalence of Anemia related to Iron insufficiency was high (34.7%) in patients among age group 75-85 years as compared to patients among age of 65-75 years i.e.(27.2%) . Similarly, prevalence of Anemia due to unexplained reasons was also more in the patients of age 75-85 years having percentage of 7.1% in comparison to 3.5% among the age group of 65-75 years. Whereas Anemia due to Megaloblastic causes 28%, Anemia related to Myelodysplastic syndromes 21%, Chronic inflammation related Anemia 50% , Chronic kidney disease related Anemia 22% and Anemia related to endocrinopathies 20% was more prevalent among patients of age group 65-75 years as compared to patients of age 75-85 (Table 1).

Anemia due to iron insufficiency and chronic inflammation related Anemia were the common anemia present among male gender having percentage of 29.8% and 27%. Also, anemia due to megaloblastic cause and anemia related to endocrinopathies were noted with the prevalence of 13% and 10.7% respectively. Like male gender, anemia due to iron insufficiency and anemia related to chronic inflammation were most common causes among female gender having percentages of 29.4% and 17% respectively whereas anemia related to Megaloblastic causes, anemia related to myelodysplastic syndromes, Chronic kidney disease related Anemia , Anemia related to endocrinopathies and Anemia due to unexplained causes were almost equal among female gender**.** The prevelance of anemia related to myelodysplastic syndromes and chronic kidney disease related anemia was found more in female gender as compared to male gender (Table 2).

Table No. 1: Comparison of prevalence according to age

Reasons of anemia	Age group		P value
	65-75 years	75-85 years	
Anemia related to iron insufficiency			
Yes	110(27.2%)	68(34.7%)	0.117
No	294(72.8%)	128(65.3%)	
Anemia due to megaloblastic cause			
Yes	56(13.9%)	16(8.2%)	0.106
No	348(86.1%)	180(91.8%)	
Anemia related to myelodysplastic syndrome			
Yes	42(10.4%)	14(7.1%)	0.247
No	362(89.6%)	182(92.9%)	
Chronic inflammation related anemia			
Yes	100(24.8%)	50(25.5%)	0.497
No	304(75.2%)	146(74.5%)	
Chronic kidney disease related anemia			
Yes	44(10.9%)	12(6.1%)	0.130
No	260(89.1%)	184(93.9%)	
Anemia related to endocrinopathies			
Yes	40(9.9%)	20(10.2%)	0.541
No	264(90.1%)	176(89.8%)	
Anemia due to unexplained reasons			
Yes	14(3.5%)	14(7.1%)	0.131
No	390(96.5%)	919(92.9%)	

Table No. 2: Comparison of prevalence according gender

Reasons of anemia	Gender		P value
	Male (n=430)	Female(n=170)	
Anemia related to iron insufficiency			
Yes	128(29.8%)	50(29.4%)	0.532
No	302(70.2%)	120(70.6%)	
Anemia due to megaloblastic cause			
Yes	56(13.0%)	16(9.4%)	0.256
No	374(87%)	154(90.6%)	
Anemia related to myelodysplastic syndrome			
Yes	38(8.8%)	18(10.6%)	0.362
No	292(91.2%)	152(89.4%)	
Chronic inflammation related anemia			
Yes	116(27%)	34(20%)	0.133
No	314(73%)	136(80%)	
Chronic kidney disease related anemia			
Yes	36(8.4%)	20(11.8%)	0.241
No	394(91.6%)	150(88.2%)	
Anemia related to endocrinopathies			
Yes	46(10.7%)	14(8.2%)	0.343
No	384(89.3%)	156(91.8%)	
Anemia due to unexplained reasons			
Yes	12(2.8%)	16(9.4%)	0.020
No	418(97.2%)	154(90.6%)	

Socioeconomic status shows group with low socioeconomic status individuals had anemia related to Iron insufficiency in 27.9% cases, anemia related to megaloblastic causes in 15.8% cases, MDS related anemia in 8.7% cases, Anemia of chronic inflammation in 24% cases, Chronic kidney disease related anemia in 7.7% cases, anemia related to endocrinopathies in 12% cases and Unexplained anemia in 3.8% cases. While individuals in other group had anemia related to Iron Insufficiency in 32.5% cases, anemia related to megaloblastic causes in 6% cases, MDS related anemia in 10.3% cases, anemia of chronic inflammation in 26.5% cases, anemia of chronic kidney disease in 12% cases, anemia related to endocrinopathies in 6.8% cases and Unexplained anemia in 6.0% cases. The frequency of megaloblastic anemia was greater in low socioeconomic group and this difference showed statistical significance (Table 3).

Chronic kidney disease related anemia and anemia due to unexplained causes were found bit more prevalent among patients having malnutrition i.e., 10.7% each as compared to 8.9% and 2.7% while anemia related to iron insufficiency, anemia related to megaloblastic causes, MDS related anemia, chronic inflammation related anemia and anemia related to endocrinopathies were found more among other group of patients (Table 4).

Table No.3: Comparison of prevalence according to economic status

Reasons of anemia	Low socio-economic status		P value
	Yes (n=336)	No (n=234)	
Iron deficiency anemia			
Yes	102(27.9%)	76(32.5%)	0.234
No	264(72.1%)	158(67.5%)	
Megaloblastic anemia			
Yes	58(15.8%)	14(6.0%)	0.007
No	308(84.2%)	220(94%)	
Myelodysplastic syndrome anemia			
Yes	32(8.7%)	24(10.3%)	0.402
No	334(91.3%)	210(89.7%)	
Anemia of chronic inflammation			
Yes	88(24%)	62(26.5%)	0.365
No	278(76%)	172(73.5%)	
Anemia of chronic kidney disease			
Yes	28(7.7%)	28(12%)	0.147
No	338(92.3%)	206(88%)	
Anemia of endocrinopathies			
Yes	44(12%)	16(6.8%)	0.102
No	322(88%)	218(93.2%)	
Unexplained anemia			
Yes	14(3.8%)	14(6%)	0.276
No	352(96.2%)	220(94%)	

Table No.4: Comparison of prevalence malnutrition

Reasons of anemia	Malnutrition		P value
	Yes (n=150)	No (n=450)	
Iron deficiency anemia			
Yes	42(28%)	136(30.2%)	0.417
No	108(72%)	314(69.8%)	
Megaloblastic anemia			
Yes	12(8%)	60(13.3%)	0.152
No	138(92%)	390(86.7%)	
Myelodysplastic syndrome anemia			
Yes	18(12%)	38(8.4%)	0.241
No	132(88%)	412(91.6%)	
Anemia of chronic inflammation			
Yes	38(25.3%)	112(24.9%)	0.526
No	112(74.7%)	338(75.1%)	
Anemia of chronic kidney disease			
Yes	16(10.7%)	40(8.9%)	0.398
No	134(89.3%)	40.5(91.1%)	
Anemia of endocrinopathies			
Yes	10(6.7%)	50(11.1%)	0.189
No	140(93.3%)	400(88.9%)	
Unexplained anemia			
Yes	16(10.7%)	12(2.7%)	0.009
No	134(89.3%)	438(97.3%)	

DISCUSSION

Anemia in elderly patients is related to increased mortality and morbidity and it is a very frequently found condition in this population, especially in those who are hospitalized. The purpose of this study was to find out the frequencies of different underlying conditions that lead to anemia in elderly population There is controversy in literature regarding definition of anemia in older population.In 1960s WHO criteria were established in a group lacking individuals older than 65 years, (6, 8) thus making their general applicability in the elderly to be questioned. By using a threshold of less than the mean minus two SDs[7,9] or by using percentiles other definitions are established. WHO definition was used in this study because it is used in the majority of studies published as the literature contains no generally accepted definition of anemia in the older population.[11,12]

In the present study, the mean age of patients was 73.14+4.05 years. In a study done by Artz et al. mean age of patients was calculated 76.0 years.[13] Another study done by Merchant et al. showed mean age of 78.2 years.[14-16] The mean age of our study population is comparable with these studies.

In present study there were(430) 71% males and 170(29%) females which show high prevalence of anemia in elderly men. This sex difference has been observed in other studies as well. Study done by Skjeebakken et al[4] included 26530 participants from community aged 24 years and above and found that prevalence of anemia in males aged 65 years and above was 29.6% and those of females was 16.5%. Similarly Salive et al[5] studied 3946 elderly people and of those who were anemic 41% were males and 21% were females. This difference in sex distribution can be explained on the basis of lower normal haemoglobin level of elderly women (postmenopausal) as compared to men by WHO.

In the present study, frequency of IDA was found to be 29.7%,ACD was found in 25% elderly patients, anemia related to chronic kidney disorder in 9.3%, anemia related to endocrinopathies in 10%, megaloblastic anemia in 12% cases, MDS related anemia in 9.3% and unexplained anemia in 4.66% elderly patients.

In a similar study done by Artz et al[19] frequency of different causes of anemia in elderly was IDA in 23%, ACD in 35%, chronic kidney disease in 8%, anemia related to endocrinopathies in less than 5%, megaloblastic anemia in 14%, MDS related anemia in 5% and unexplained anemia in 45%.[17]

In NHANES III prevalence of different causes of anemia in elderly group was IDA 16.6%, megaloblastic anemia 2.0%, ACD 19.7%, anemia related to chronic kidney disorder 8.2% and Unexplained Anemia 33.6%.[12,16] Another study done INCHIANT showed IDA 17.4%, megaloblastic anemia 10.5%, ACD 24.4%, anemia related to chronic kidney disorder 10.5% and unexplained anemia 37.2%.[16,17]

According to another study done by van Houwelingen et al[8], the five most prominent causes of anemia were ACD (30-45%), Iron deficiency (15-30%), megaloblastic anemia (5-10%), MDS related anemia (5%) and Unexplained anemia (15-25%).

Present study and comparative studies show Nutrition deficiency anemia and anemia of chronic disorder as prominent causes of anemia in aged population. Anemia due to iron insufficiency is however having more frequency as compared to other studies. This may be because we included elderly patients in hospital setting who have more comorbidities like dental issues and gastrointestinal bleeds as compared to other community population based studies.

Present study shows high prevalence of anemia related to endocrinopathies as compared to other studies by van Houwelingen et al[8] and Artz et al.[19] This can be explained on the basis that other studies in comparison has been done on community dwelling ambulatory population as compared to hospitalized cohort in our study.

Similarly our present study shows low prevalence of Unexplained anemia because it is more frequent in community dwelling individuals who have occult malignancies and undiagnosed hidden cases of MDS as a cause of unexplained anemia and once the patient comes to hospital as in our study multiple investigations and labs help to reach a definitive diagnosis.[7,18]

Depending on their clinical setting the causes of anemia differ in elderly population. However, anemia related to chronic inflammation and anemia related to iron insufficiency are the most common treatable forms of anemia both in hospitalized and community-dwelling elderly populations.[19]

According to this study anemia related to chronic renal disease was found in about 9% of the elderly patients assessed. While according to previous studies, anemia related to chronic renal disease showed prevalence of about 17.5%,but these studies used criterion for chronic kidney disease as glomerular filtration rate (GFR) of <30 mL/min.[19,20]

We divided our study cohort into two age groups .Similarly we divided our study population into two groups on the basis of gender, socioeconomic status and malnutrition. This was intended to see any differences in types and pattern of anemia between the two groups. The frequency of unexplainable anemia was greater in group having malnutrition.[20,21]

We also found that frequency of megaloblastic anemia was greater in low socioeconomic group. According to a study, people in lower socioeconomic groups have double the risk of megaloblastic anemia as compared to those who belong to middle or upper class (9, 21). This can be explained by lack of vitamin B12 and folate in their diet because these are expensive sources of food and partly explained by poor dentition in old age.

CONCLUSION

Iron deficiency anemia is found as the most frequent cause of Anemia in our study cohort. SO the elderly population must be considered accordingly for the treatment of such cases.

Author's Contribution:

Concept & Design of Study:	Madiha Islam
Drafting:	Amna Arooj, Mona Aziz
Data Analysis:	Sadia Taj
Revisiting Critically:	Madiha Islam, Amna Arooj
Final Approval of version:	Madiha Islam

Conflict of Interest: The study has no conflict of interest to declare by any author.

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