Original Article

MORPHOLOGICAL TYPES OF ANEMIA AND ITS ASSOCIATION IN GERIATRIC POPULATION

Hamid Iqbal[1], Waqas Hanif[2], Saima Gul[3], Mahwish Akhtar Qureshi[3], Umer Shujat[4], Noreen Anwar[5]

[1]Combined Military Hospital, Quetta Pakistan
[2]Combined Military Hospital, Bannu Pakistan
[3]Combined Military Hospital, Multan Pakistan
[4]Fazaia Medical College, Islamabad Pakistan
[5]Quetta Institute of Medical Sciences (QIMS), Quetta Pakistan

ABSTRACT

Objective: To determine the prevalence and morphological types of anemia in geriatric patients in a tertiary care hospital.

Material and Methods: This cross-sectional descriptive study was conducted out at Combined Military Hospital, Multan, a tertiary care hospital Pakistan from September 2019 to February 2020. After due approval of Ethical review committee, a total of 175 elderly patients ranging from 50 to 80 years of age of all genders referred to the hematology department for Blood Complete Picture and RBC morphology were included in the study after formal consent. Patients taking immunosuppressive/ steroid therapy and with history of recent blood transfusions were excluded. 2ml blood sample was taken in EDTA and analyzed using Sysmex KXx 21 hematology Analyzer. Leishman-stained Peripheral blood film examination for RBC morphology of patients with Hemoglobin level of < 10 g/dl was also performed and results recorded.

Results: The age of 175 patients ranged from 50 to 80 years with mean of 65.77± 6.23 years. Majority of the patients 90 (51.43%) were between 50 to 65 years of age. In this study, frequency of anemia in elderly population was found in 41 (23.43%) patients. Most frequent anemia was normocytic anemia 75.61% followed by macrocytic 19.51% and microcytic anemia 4.88%.

Conclusion: The anemia is quite prevalent in older patients with normocytic anemia being the commonest.

Key Words: Anemia, Elderly population, Normocytic, Macrocytic, Microcytic

This article can be cited as: Iqbal H, Hanif W, Gul S, Qureshi MA, Shujat U, Anwar N. Morphological types of anemia and its association in geriatric population. Pak J Pathol. 2023; 34(2): 47-50.

DOI: 10.55629/pakjpathol.v34i2.730

INTRODUCTION

Provision of health care to old age population is an important part of the health care system of the country, that's why timely and correct identification of medical issues in old age population is crucial to maintain the stability of health care system and provision of quality health to whole population [1]. Among all health issues of this population, anemia is one of the most prevalent issues in the older population and increases with increasing age. According to World Health Organization (WHO) anemia is Hb < 12 g/dL in women and Hb < 13 g/dL in men [2].

Nutritional deficiency is the most common cause of anemia observed globally. It affects almost one fourth of total world population. Anemia includes in list of most prevalent world widely public health diseases [3]. According to WHO, anemia among women has been found around 14% in developed countries while 51% in developing countries and most of these are above 45 years of age [4].

Correspondence: Dr Waqas Hanif, Consultant Pathologist, Combined Military Hospital, Bannu Pakistan

Email: **drwaqas10@yahoo.com**

*Received: 24 Sep **2022**; Revised: **05 Jun 2023**; Accepted: **22 Jun 2023***

Anemia affects the South Asian countries badly. About half of all worldwide deaths in women (especially geriatric population) due to anemia occurs in South Asian countries [5]. Morbidity and mortality related to anemia also increased with progression of age which significantly affects quality of life too. Due to heterogeneity and diversity of prevalence of anemia and ageing, it is challenging to determine the accurate epidemiology of anemia in old age in different social, cultural and biological environment [6].

According to National Representative Survey of Mexico anemia was found to be 17.1% in 2006 in elder population and 16.5% in 2012 [7]. A large proportion of individuals presented with anemia are patients of chronic inflammation or renal impairment and chronic disease [8]. Nutrients deficiency like malnutrition may lead to deficiency of Cyanocobalamin (vitamin B12), folate, and iron, resulting in different subtypes of anemia [9]. Moreover, a large number of undiagnosed malignant disorders like myelodysplastic syndrome (MDS) presents in the form of anemia [10].

MATERIAL AND METHODS

It is a cross sectional descriptive study conducted after the approval of ethical review committee with IRB certificate number 31-10-19 of Combined Military Hospital (CMH) Multan. The study was carried out from September 2019 to February 2020 in Pathology department Combined Military Hospital Multan. The sample size was 175 which was calculated while keeping the confidence level (1-α) 95%, absolute precision required (d) to be equal to 0.09 and taking appropriate anticipated population proportion (p). A total of one hundred and seventy five patients of more than 50 years of age of all genders were included in this study. Non-probability consecutive sampling technique was used for sample collection. Patients referred to the hematology department for Blood Complete Picture and RBC morphology were studied after formal consent. Patients taking immunosuppressive / steroid therapy and with history of recent blood transfusions were excluded After the informed verbal and written consent from the participants in this study, 2.0 ml venous blood sample was taken in EDTA tube. Blood was analyzed using the Sysmex KX-21 Haematology semi-automated haematology analyzer for blood complete picture. Leishman stained peripheral blood film was prepared and examined for RBC morphology of all participants with hemoglobin < 10 g/dl. Reports were analyzed for presence or absence and morphological types of anemia. SPSS version 21.0 was used as a statistical tool for analysis. Chi square was used to see statistical association of anemia with older population and p-value ≤ 0.05 was taken as statistically significant.

RESULTS

175 participants 50 to 80 years of age with mean of 65.77 ± 6.23 years were participated in the study and 90 (51.43%) patients were of 50 to 65 years of age. Stratification of patients according to age and gender is shown in Table-I.

In this study, frequency of anemia in elderly population was found in 41 participants (23.43%). Normocytic anemia was the most frequent subtype (75.61%) followed by macrocytic (19.51%) and microcytic (4.88%) as shown in Table-II.

Table-I: Stratification of patients according to age and gender (n=175).

Age (Years)	No. of Patients (%)	Anemia		p Value
		Present	Absent	
50-65	90 (51.43)	19	71	0.456
66-80	85 (48.57)	22	63	
Gender				
Male	88 (50.29)	21	67	0.891
Female	87 (49.71)	20	67	

Table-II: Frequency of different types of anemia in 41 patients out of 175.

Type	Number of patients	% age
Normocytic	31	75
Microcytic	02	04
Macrocytic	08	21

DISCUSSION

We found that anemia was present in 41 individuals in our study. Among these individual, normocytic anemia was found in 31 (75%), 2 (4 %) individuals show microcytic and 8 (21%) showed macrocytic anemia in geriatric population.

It is mentioned in literature that ageing effects blood cell production by reducing ratio of active bone marrow to fat cells and reduces marrow response to erythropoietin [11]. Due to high morbidity and mortality in anemia, it has emerged as global health issue in older population. The reported prevalence range of anemia is very wide in the old age population (> 50 years) i.e. 2.9–51 % and severity is associated with advanced age and multiple chronic conditions, including iron deficiency, inflammatory conditions, malignancy, and low serum erythropoietin. Another factor which is associated with severity of anemia in old age population is presence of multiple causes of anemia simultaneously [12].

We carried out this study to detect the frequency of anemia and its morphological types in geriatric population. Our results correspond the finding of studies by William *et al*, Jain V *et al* [13], and Kim *et al* But on the other hand, studies by Tettamanti *et al* [14] and Choi *et al* the anemia was prevalent relatively older in older population of age 70-79 years. Probable reason of this difference is the shorter life span in our population than their ones. The male to female ratio was 1.1:1 in our study shows that anemia was slightly more in males as compared to females. These findings of our study correspond to the finding of studies by Ramachandra *et al* [15], Tay *et al* and Shavelle *et al*, In the study conducted by Choi *et al*, the male to female ration was reverse and elderly anemic females were more than males.

Findings of the study by Sahin *et al* [16] are similar to the finding of our study, who reported that normocytic anemia was the most ubiquitous subtype (78.0%) followed by macrocytic (18.4%) and microcytic (3.7%). In our present study, frequency of anemia was 23.43% while Tay and Ong [17] found the frequency of anemia (57.1%). Most probable reason of this difference is difference in selection the criteria and definitions of anemia. Study conducted by Tay and Ong was retrospective and performed on older hospitalized patients with age group of 65 years

or above. However, our results are comparable with the frequencies reported by Sgnaolin *et al* [18] (22.8%), Nakashima *et al* [19], (29%), and Bang *et al* [20], (18.33%). The reason for the differences in frequencies could be the characteristics among different populations studied. Similarly, higher prevalence (36.7%) were reported by Reykjavik, Iceland, and (30.6%) by NHANES III for black Americans, Elis *et al* [21] and Ania *et al* [22].

CONCLUSION

The anemia in geriatric population is quite prevalent with normocytic anemia being commonest type. Public awareness regarding this health issue among elderly population as well as treating clinicians is highly recommended for a better future outcome in every aspect to reduce the morbidity of this particular population. The results of this study will establish useful databank which will be supportive for researchers to design more studies in future to further delineate the social, cultural and environmental factors behind anemia in this age group.

LIMITATIONS OF STUDY

A large multi-centered study should be performed to establish true cause and strong evidence of temporal evidence.

CONFLICT OF INTEREST

None

AUTHOR CONTRIBUTION

Hamid Iqbal: Study Design
Waqas Hanif: Manuscript writing
Saima Gul: Data Collection
Mahwish Akhtar Qureshi: Data Analysis
Umer Shujat: Manuscript review
Noreen Anwar: Literature review

REFERENCES

1. Aithal K, Meti K, Jain S. A study of pattern and causes of anemia in elderly patients admitted at tertiary centre. Sch J App Med Sci. 2017; 5(4D):1483-6. DOI: 10.36347/sjams.2017.v05i04.049
2. Kamel M, Ebeid S, Elakkad R, Shafeek N. Prevalence of anemia among community dwelling elderly in dakahlia as a representative of rural areas in Egypt and its impact on their functional status. Adv Aging Res. 2015;4:168-76
3. Bach V, Schruckmayer G, Sam I, Kemmler G, Stauder R. Prevalence and possible causes of anemia in the elderly: a cross-sectional analysis of a large European university hospital cohort. Clin Interv Aging. 2014;9:1187–96.
4. Bianchi VE. Anemia in the elderly population. J Hematol. 2014; 3(4): 95-106. DOI: http://dx.doi.org/10.14740/jh182w
5. Mangla M, Singla D. Prevalence of anaemia among pregnant women in rural India: a longitudinal observational study. Int J Reprod Contracept Obstet Gynecol. 2016; 5: 3500-5. DOI: https://doi.org/10.18203/2320-1770.ijrcog20163431
6. Qaseem A, Humphrey LL, Fitterman N, Starkey M, Shekelle P. Treatment of anemia in patients with heart disease: a clinical practice guideline from the American College of Physicians. Ann Internal Med. 2013;159(11):770–9.
7. Contreras-Manzano A, de la Cruz V, Villalpando S, Rebollar R, Lab T, ShamahLevy T. Anemia and iron deficiency in Mexican elderly population. Results from the Ensanut 2012. Salud Pública de México. 2015; 57(5): 394-402.
8. Goddard AF, James MW, McIntyre AS, Scott BB. Guidelines for the management of iron deficiency anaemia. Gut. 2011;60(10):1309–16.
9. Wu F, Jing Y, Tang X, Li D, Gong L, Zhao H, *et al*. Anemia: an independent risk factor of diabetic peripheral neuropathy in type 2 diabetic patients. Acta Diabetol. 2017; 54(10): 925-31. DOI: 10.1007/s00592-017-1025-7.
10. Lengline E, Drenou B, Peterlin P. Nationwide survey on the use of eltrombopag in patients with severe aplastic anemia: a report on behalf of the French Reference Center for Aplastic Anemia. Haematologica. 2018; 103(2): 212-20. DOI: 10.3324/haematol.2017.176339.
11. Nakashima ATA, de Moraes ACF. Anemia prevalence and its determinants in Brazilian institutionalized elderly. Nutrition J. 2012;28:640–643
12. Riva E, Colombo R, Moreo G, Mandelli S, Franchi C, Pasina L, *et al*; REPOSI Investigators.Prognosticvalue of degree and types of anaemia on clinical outcomes for hospitalised older patients. Arch Gerontol Geriatr. 2017; 69: 21-30. DOI: 10.1016/j.archger.2016.11.005.
13. Jain V. Pattern of anemia in elderly patients. Int J Res Med Sci. 2019; 7: 2524-9.
14. Tettamanti M, Lucca U, Gandini F, Recchia A, Mosconi P, Apolone G, *et al*. Prevalence, incidence and types of mild anemia in the elderly: the “Health and Anemia” population-based study. Haematologica. 2010; 95(11): 1849-56. DOI: 10.3324/haematol.2010.023101.
15. Ramachandra SS, Kasthuri A. Anemia in the Elderly Residing in a South Indian Rural Community. Indmedica, Indian J Practising Doc. 2008; 5(4).
16. Sahin S, Tasar PT. Prevalence of anemia and malnutrition and their association in elderly nursing home residents. Aging Clin Exp Res. 2016; 28: 857–62. DOI: 10.1007/s40520-015-0490-5
17. Tay MR, Ong YY. Prevalence and risk factors of anaemia in older hospitalised patients. Proceedings of Singapore Healthcare. 2011; 20(2): 71-9.
18. Sgnaolin V, Engroff P, Ely LS. Hematological parameters and prevalence of anemia among free-living elderly in south Brazil. Rev Bras Hematol Hemoter. 2013; 35: 115–8. DOI: 10.5581/1516-8484.20130032.
19. Nakashima ATA, de Moraes ACF. Anemia prevalence and its determinants in Brazilian institutionalized elderly. Nutrition J. 2012; 28: 640-43. DOI: 10.1016/j.nut.2011.09.016.
20. Bang SM, Lee JO, Kim YJ, Lee KW, Lim S, Kim JH. Anemia and activities of daily living in the Korean urban elderly population: Results from the Korean longitudinal

study on Health and Aging (KLoSHA). Ann Hematol. 2013; 95: 59-65. DOI: 10.1007/s00277-012-1563-6.

21. Elis A, Ravid M, Manor Y, Bental T, Lishner M. A clinical approach to idiopathic normocytic–normochromic anemia. J Am Geriatr Soc. 1996; 44: 832–34. DOI: 10.1111/j.1532-5415.1996.tb03743.x

22. Ania BJ, Suman VJ, Fairbanks VF. Incidence of anemia in older people: An epidemiologic study in a well defined population. J Am Geriatr Soc. 1997; 45: 825-31. DOI: 10.1111/j.1532-5415.1997.tb01509.x