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Research Article

**THE PREVALENCE AND RELATIONSHIP OF ANEMIA IN
ELDERLY HOSPITALIZED PATIENTS WITH
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Abstract:

Objective: The aim of our study was to find out the prevalence and relationship of anemia in elderly hospitalized patients with comorbidities.

Study Design: A descriptive study.

Place and Duration: This study was conducted at medical department, Allied hospital Faisalabad for the duration of one year starting from November, 2019 to October, 2020.

Methodology: In our present study we selected 100 patients with the use of non-probability convenient sampling technique. According to World Health Organization (WHO) criteria we defined anemia as Hemoglobin in Females were <12 g/dL and in Males were <13 g/dL. According to grades of anemia: in severe grade of patient's hemoglobin were <8g/dl, in mild grade of patient's hemoglobin were between 11g/dl and lower limit of normal and in moderate grade of patient's hemoglobin were between 8 g/dl and 10.9 g/dl. SPSS version 20 was used for the analysis of data.

Results: In our present study we selected 100 patients in which 63% were found to be anemic. 57% patients were found in mild form of anemia, 30% patients were found in moderate form of anemia and 12% patients were found in severe form of anemia. 49% of anemic patients had 3 or more comorbidities. According to gender distribution, 53 patients were male and 47 patients were female. In our study the most common diseases are heart disease, diabetes chronic kidney disease and hypertension.

Conclusion: At the end of our study, we conclude that frequency of anemia is more in hospitalized patients and its directly associate with number of comorbidities. Physicians should have a high index of skepticism and low threshold for treatment of anemia in elderly patients as this can significantly impact the disease outcome.

Key Words: Comorbidities, Geriatric, Elderly, Anemia, Hospitalized

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INTRODUCTION:

The geriatric population is expected to show an alarming rise by the end of 21st century posing fresh challenges to the health care provider and putting additional constraints on meager health resources. Elderly are a neglected population in Pakistan health care system and geriatric medicine is still not practiced as a distinct specialty. With advancing age, the frequency of chronic diseases and psychological ailments increases. Anemia is a frequently encountered problem in geriatric practice world over and has rightly been called “an emerging problem for the 21st century” [1].

The mean prevalence of anemia in elderly ranges from 12% in the community to 40% in hospitalized patients [2,3]. Anemia in older patients is often mild and asymptomatic but it is associated with many adverse outcomes such as cognitive decline, dementia, depression, functional deterioration and frequent incidence of falls [4,5]. It is also an independent predictor of mortality as concluded by Leiden 85 study [6]. There has been a growing interest in the recent few years to unfold the association between anemia and various comorbidities found in this age group. There is now sufficient evidence to suggest that anemia has a negative impact on the outcome of diseases like diabetes and hypertension [7,8]. A study conducted by Nathavitharana *et al* has suggested that presence of anemia in hospitalized elderly patients is associated with more frequent readmissions, longer hospital stay, and adverse outcomes in terms of morbidity and mortality [9]. More recently, Abrahamsen *et al* concluded that more elderly patients with explained anemia died or were readmitted after one year of acute hospitalization as compared to their non-anemic counterparts or those with unexplained anemia [10]. This highlights the significance of early diagnosis and treatment of correctable causes of anemia such as nutritional anemia in this vulnerable age group. Despite such conclusive evidence, there is a dearth of information regarding prevalence of anemia in our geriatric population and its clinical impact. Present study was conducted to determine the type and severity of anemia in elderly hospitalized patients and their association with comorbidities.

METHODOLOGY:

This descriptive study was conducted at medical department, Allied hospital Faisalabad for the duration of one year starting from November, 2019 to October, 2020. A total of 100 hospitalized elderly patients (65 years and above), both male and female were selected by non- consecutive convenient sampling. Sixty-five

years age was used as a cutoff point which is widely accepted and utilized in previous studies. The study was initiated after the approval of study proposal by the Institutional Ethical Committee. Informed consent from all participants was obtained. Patients with malignancy, critical illness/those requiring ICU admission, unstable congestive cardiac failure, decompensated liver disease, congenital hemoglobinopathies, history of recent surgery or blood transfusion and those on anti-anemic treatment were excluded. Data analysis was done on the basis of detailed history, medical records, and routine laboratory parameters done on hospital admission.

Complete blood counts were generated through Sysmex XP-100 hematology analyzer with routine quality control. Peripheral blood films were examined by consultant hematologist after staining with Leishman's stain. Urinalysis, fasting blood sugar, renal function tests (serum urea and creatinine), electrolytes (serum sodium and potassium), liver function tests (serum bilirubin, alanine transaminase, alkaline phosphatase), and electrocardiogram (ECG) were performed as part of admission protocol. We used the same reference ranges for various tests as established by our laboratory. Anemia was defined according to the World Health Organization (WHO) criteria: Hemoglobin <13 g/dL in males and <12 g/dL in females [11]. The patients were classified according to the severity of anemia as well as morphological type of anemia based on hemoglobin level, blood cell indices and peripheral film.

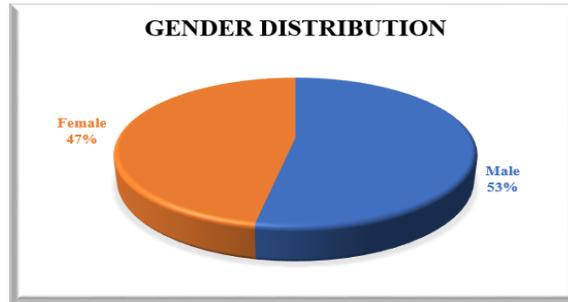
Three grades of anemia were differentiated as per WHO criteria: mild (hemoglobin between 11g/dl and lower limit of normal), moderate (hemoglobin between 8 g/dl and 10.9 g/dl), and severe (hemoglobin <8g/dl). Based on data from literature and reference values for hemoglobin level, hematocrit, total red blood cell count, blood cell indices and peripheral smear, anemia was classified as microcytic (<77 FL), normocytic (77–96 FL), or macrocytic (>96 FL) [12]. Data was analyzed using IBM SPSS 20. Categorical data was calculated as frequencies and percentages. Comparison of study variables was performed by Chi-square test. P-value of less than 0.05 was considered significant at 95% confidence interval.

RESULTS:

A total of 100 hospitalized patients > 65 years of age were included after meeting inclusion & exclusion criteria. Of these, 53 were male and 47 were female patients.

Table No 01: Gender Distribution

Gender	Qty	%age
Male	53	53%
Female	47	47%
Total	100	100%



According to WHO classification, 63 (63%) patients were found to be anemic. Females showed a higher incidence of anemia (70.2% vs. 56.6%) but the gender difference was not statistically significant. Amongst 65-69 years age group, 60.4% (29/48) patients, in 70-79 years, 60.5% (23/38) and in patients 80 years above, frequency of anemia was 78.5% (11/14). No statistically significant association was found between patient's age & hemoglobin levels although the prevalence of anemia increased with rising age. There was no association between age and severity of anemia. In majority of the patients (36/63 or 57%) anemia was mild.

Table No 02: Frequency of Anemia According to Age

Age year	Qty (%age)	Total
65-69 years	29 (60.4%)	48
70-79 years	23 (60.5%)	38
Greater Than 80 year	11 (78.5%)	14

All patients were evaluated for comorbidities common for this age group. These included diabetes, hypertension, chronic kidney disease, heart disease, stroke, obstructive airway disease, rheumatological disorders, chronic liver disease & infections. Hypertension, diabetes, heart disease and chronic kidney disease were the most common diseases seen in this study. All these conditions were more frequently seen in anemic rather than non-anemic patients. The association between anemia and chronic kidney disease was also statistically significant. (p value < 0.01) When comparing anemic and non-anemic patients in terms of number of comorbidities in a single patient, anemic patients had a higher number of comorbidities. Nearly half (31/63 or 49%) of the anemic patients had 3 or more comorbidities as compared to 21% (8/37) non-anemic patients and the correlation was statistically significant at 0.01 level (p value 0.009).

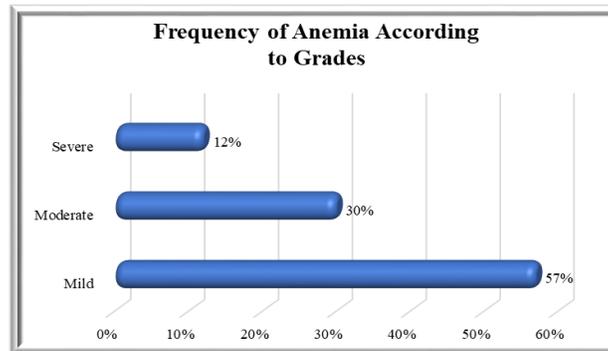
Table No 03: Common Comorbidities in Non-Anemic and Anemic Patients

Comorbidity	Non-Anemic Patients (%)	Anemic Patients (%)
Hypertension	29.7%	42.2%
Diabetes	35.1%	44.4%
Heart Disease	32.4%	34.9%
CKD	10.8%	42.8%
Infections	37.8%	28.5%
COPD	18.9%	15.8%
CLD	16.2%	11%
Arteritis	10.8%	9.5%

In our present study we selected 100 patients in which 63% were found to be anemic. 57% patients were found in mild form of anemia, 30% patients were found in moderate form of anemia and 12% patients were found in severe form of anemia.

Table No 04: Frequency of Anemia According to Grades

Grades	Percentage
Mild	57%
Moderate	30%
Severe	12%



DISCUSSION:

The results of our study confirm a high prevalence (63%) of anemia in our geriatric hospitalized patients. Majority of the patients had a mild normocytic normochromic anemia. Presence of anemia in a single patient was significantly correlated with number of comorbidities mainly diabetes, hypertension, heart disease and chronic kidney disease. Frequency of anemia in the present study was higher than the frequency reported in community-dwelling adults, but is in agreement with the data reported from nursing home residents and hospitalized patients, while analyzing data from a large European university hospital cohort reported frequency of anemia as 21.1% [13]. Another observational cohort study found the prevalence of anemia 48% [14]. The highest frequency of anemia in geriatric patients was determined by Giesel et al in a retrospective hospital-based study in which 63.3% of their elderly patients were found to be anemic [15]. Results of our study therefore, are in accordance with Geisel et al.

Literature review suggests that anemia is significantly correlated with advanced age and male sex. The percentage rises with age and is reported as high as 50% in individuals 80 years and above [16,17]. Results of our study also show that anemia increases with advancing age as 78.8% of our patients >80 years of age were anemic. However, female patients in our study were found to be more frequently anemic than

their male counterparts (70.2% vs. 56.6%). A simple explanation of this is the fact that women in developing parts of the world are inherently at a greater risk of anemia due to socioeconomic, cultural and biological factors with low body iron stores resulting from early marriages, multiple pregnancies etc. Worldwide the dominant morphological pattern of anemia reported is normocytic normochromic with majority of the elderly population having only a mild anemia. More than half (57%) of our study population had mild anemia, however an equally large number of patients had moderate (30%) or severe (12%) anemia. It may be argued that this was due to the fact that ours was a hospital-based study, however in comparison to previous hospital-based studies these figures were still alarmingly high. Type and severity of anemia can be a useful predictor of in-hospital and post discharge mortality. In a most recent study, Riva et al [18] concluded that even mild anemia was a significant predictor of hospital readmission in older patients and the 3-month mortality risk was directly proportional to the severity of anemia.

The study results further showed that normocytic normochromic anemia was associated with worst prognosis irrespective of severity. This is understandable, as prevalence of serious illnesses like diabetes, hypertension, heart disease etc. all increase with age resulting in anemia of chronic disease which is the major cause of normocytic normochromic

anemia. Predominant morphological pattern of anemia in our study was also normocytic normochromic (61.9%) which is in keeping with previous studies. However, in contrast to Western studies, frequency of microcytic anemia in our study population was quite high (31.7%) with almost every third patient having microcytic hypochromic anemia. This is a significant finding keeping in view that the most common cause of microcytic anemia is iron deficiency which is a readily correctable cause of anemia. Vitamin B12 and folate deficiency are also correctable causes of anemia and are a common cause of macrocytic anemia in developing countries like Pakistan [19]. In the present study, 6.3% of our patients had macrocytic anemia. In a previous study, we have reported frequency of vitamin B12 and folate deficiency as 10% and 7% respectively [20]. Prevalence of nutritional anemia in the developing world is high. The National Health and Nutrition Examination Survey (NHANES III), also reports that one-third of the elderly anemic patients have nutritional anemia mainly iron deficiency. Anemia in elderly is often complicated by the fact that majority of these patients have nutritional anemia in the background of anemia of chronic disease. It may not always be possible to treat the underlying disorder however, correction of coexisting nutritional anemia such as iron deficiency can significantly influence the outcome in many diseases such as chronic kidney disease and heart failure [21,22].

One of the most significant aspects of our study was that it highlights the association between anemia and presence of comorbidities in a patient. In a recently published study, Migone et al have concluded that anemia is independently associated with higher number of comorbidities in a single patient [14]. This can have important therapeutic implications as untreated anemia is known to negatively affect outcomes in terms of primary illness such as diabetes [7], hypertension [8], heart failure [22], chronic obstructive pulmonary disease [23], etc. [24]. While the prevalence of all these diseases was overall high in our study population, the frequency of most of these disorders was much higher in anemic patients. Chronic kidney disease was thrice as common in anemic patients and had a significant association with anemia. Correction of anemia in chronic kidney disease is an integral part of management of patients with renal disease. The association between anemia and chronic kidney disease is well known and renal disease should be excluded in every elderly individual with unexplained anemia. In terms of number of comorbidities in a single patient, more than half of our anemic patients had at least 3 or higher number of comorbidities as compared to their non-anemic

counterparts (49% vs. 21%). The correlation between presence of anemia and number of comorbidities per single patient was statistically significant (p value < 0.01).

The present study was not aimed to determine the etiology of anemia therefore the data is based only on previously diagnosed coexisting diseases in our patients which may be considered as a limitation of the study. It may be argued that primary illness of an individual patient can act as confounder, affecting presence or severity of anemia. However, we applied stringent exclusion criteria and an attempt was made to include only stable patients admitted in general medical ward with diseases common in this age group. Furthermore, the exact causal link between anemia and different comorbidities needs to be evaluated. The disease burden in Pakistani geriatric population is very high with diabetes, hypertension and arthritis as the most common illnesses [25]. Anemia often remains under diagnosed because of vague signs and symptoms which are generally attributed to co-existing illnesses or simply old age. Given the clear association between even mild anemia and morbidity in this age group, findings of our study may have clinical significance in the management of elderly patients with anemia. More studies to explore various aspects of clinical impact of anemia are needed to further evaluate this important aspect of geriatric health.

CONCLUSION:

At the end of our study, we conclude that frequency of anemia is more in hospitalized patients and its directly associate with number of comorbidities. Physicians should have a high index of skepticism and low threshold for treatment of anemia in elderly patients as this can significantly impact the disease outcome.

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