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Original Article

Internal Medicine Section

Incidentally Detected Anaemia in Elderly: A Cross-sectional Study from a Tertiary Care Hospital, Pune, Maharashtra, India

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ABSTRACT

Introduction: Iron Deficiency Anaemia (IDA) is most prevalent nutritional deficiency observed worldwide. The elderly population is particularly susceptible. It is a significant risk factor for increased mortality and morbidity, reducing mobility and quality of life. Currently, less Indian data is available for incidentally detected anaemia in elderly. The known causes of anaemia in elderly are nutritional, anaemia of chronic disease and malignancy.

Aim: To evaluate the haematological profile and to identify potential aetiologies of anaemia in elderly who had an incidental diagnosis of anaemia.

Materials and Methods: This was a prospective cross-sectional hospital-based observational study, which included 90 incidentally diagnosed patients with anaemia above 60 years of age, admitted in Department of General Medicine, Bharati Vidyapeeth Deemed to be University Medical College, Hospital and Research Centre, Pune, Maharashtra, India during March 2021 to September 2022. Complete Blood Counts (CBCs) with peripheral blood smear, Haematocrit (Hct), reticulocyte counts, Red Blood Cells (RBC) indices like Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH) and cell morphology were all examined for each patient. The statistical programme Statistical Package for the Social Sciences (SPSS) (version 26.0) was used to analyse the data. The Chi-square test was used to evaluate the qualitative parameters.

Results: The mean age was 66.44±5.87 years; 52 (57.8%) were men, and 38 (42.2%) were women. The most prevalent co-morbid conditions were diabetes and hypertension. The common clinical signs observed were pallor, oedema, knuckle pigmentation. In the present study, IDA was the most frequent aetiology 53 (58.9%), second being megaloblastic anaemia 24 (26.7%), followed by dimorphic anaemia 13 (14.4%). Gastritis was commonest finding on gastroscopy.

Conclusion: Anaemia is a common finding amongst elderly population which remains undiagnosed and is ignored. The main cause is nutritional deficiency leading to IDA, megaloblastic anaemia or dimorphic anaemia. Hence, geriatric population should undergo regular screening for early recognition of anaemia. Further large population studies are required for detailed evaluation to determine the causes of anaemia in elderly.

Keywords: Gastritis, Iron deficiency anaemia, Megaloblastic anaemia

INTRODUCTION

Haemoglobin levels <12 gm/dL in women and 13 gm/dL in men are considered anaemic, according to the World Health Organisation (WHO) [1,2]. Improved diagnostics and demographic changes in the society has led to increase in prevalence of anaemia. As per haemoglobin values on admission patients were divided in three groups: severe (Hb <8 gm/dL), moderate (Hb 8 gm/dL to <10.0) and mild (Hb 10 gm/dL to lower limit of normal) [3]. Anaemia increases the risk of several unfavourable outcomes for older adults, such as hospitalisation, morbidity, and mortality. In light of the rising prevalence of anaemia with ageing, the elderly with anaemia represent a significant demographic segment that is expanding quickly [4].

The prevalence of anaemia in elderly patients is found to be 37.88% and it is correlated with iron deficiency, inflammatory diseases, cancer, and low serum erythropoietin levels [5]. The majority of the time, chronic diseases, iron deficiency, or myelodysplastic syndromes can be found to be the underlying cause of anaemia in elderly people 65 years of age and older [6]. Further testing can reveal that one third of these elderly anaemic patients had nutritional deficiencies or myelodysplastic syndromes, one third has Chronic Kidney Disease (CKD), and one third has unexplained anaemia. One of the most frequent causes of anaemia is IDA, but because elderly people frequently have multiple co-morbid conditions, it can be challenging to diagnose IDA. Common causes of iron deficiency in elderly patients include inadequate dietary intake, malabsorption, and blood losses [7]. In National Health And Nutrition Examinations Survey (NHANES) survey it was observed that elderly had typically mild anaemia (defined as haemoglobin levels >10 g/dL). Anaemia was found in 10% of community dwelling adults above 65 years of age. In nursing homes the prevalence goes upto 48-63%. Even mild anaemia in the elderly has been linked to a number of serious adverse effects, such as a decline in physical activity, decline in cognitive function, rise in falls, rise in dementia, rise in hospitalisations, rise in mortality, and a multidimensional loss of function [8]. Anaemia was significantly associated with increased risk of death and mobility disability in western population as compared to Indians [9]. Numerous ageing symptoms, such as fatigue, shortness of breath, and diminished cognition, are also symptoms of anaemia. As a result, anaemia can be overlooked in this population. In order to increase the overall quality of life and lifespan of frail older people who are at risk for negative outcomes, haemoglobin level serves as a useful screening marker [4]. Present study aimed to find the prevalence of anaemia amongst the elderly population visiting to the tertiary care centre for reasons other than anaemia and the commonest cause of anaemia among them. This will help to formulate an algorithm for early diagnosis and prompt management of anaemia to avoid morbidity and mortality. In the current study, clinical, biochemical, and haematological findings in elderly patients with incidentally discovered anaemia were studied in order to assess the aetiopathogenesis of anaemia.

MATERIALS AND METHODS

The current study was a prospective cross-sectional hospital-based observational study carried out between March 2021 and September 2022 at the Department of General Medicine,

Bharati Vidyapeeth Deemed to be University Medical College, Hospital and Research Centre, Pune, Maharashtra, India. Ninety elderly people of either gender over the age of 60 who had incidentally been diagnosed with anaemia and haemoglobin values of <13 g/dL for men and <12 g/dL for women from the medicine OPD and ward were included in the study. The study was approved by the Institutional Ethics Committee (IEC). (Ref No.BVDUMC/IEC/9). All study participants provided informed consent.

Inclusion criteria: All subjects above the age of 60 years who were incidentally diagnosed to have anaemia were included in the study.

Exclusion criteria: Subjects who were already diagnosed with and receiving treatment for anaemia, chronic inflammatory diseases, or CKD and were receiving chemotherapy or radiation therapy were excluded from the study. Out of 130 screened, 90 subjects were included in study and 40 were excluded from study (As study aim was to diagnose incidentally detected anaemia, screening was done).

Sample size calculation: The data was provided to the statistician and sample size was calculated using appropriate statistical test.

Study Procedure

A thorough dietary and medical history, socio-demographic information and clinical examination were done as per predesigned proforma. For each patient CBC with peripheral blood smear, Hct, reticulocyte count, and RBC indices such as MCV, MCH, and Mean Corpuscular Haemoglobin Concentration (MCHC), serum iron studies and cell morphology were studied. Ultrasonography (USG) was also done in few patients. In indicated patients upper gastrointestinal tract endoscopy was done. Stool occult blood and colonoscopy could not be done in all patients, though indicated as they had some other concurrent illnesses like diabetes mellitus, hypertension, Coronavirus Disease-2019 (COVID-19), cataract, urinary tract infection, respiratory tract infections etc., for which they were being evaluated and treated.

STATISTICAL ANALYSIS

The data was analysed using SPSS statistical software (version 26.0). The qualitative parameters were presented as percentages and frequencies and compared between the groups using the Chi-square test. The quantitative parameters were presented as mean±Standard Deviation (SD), and the differences in the means were compared using the student's t-test. The p-value of <0.05 was considered significant.

RESULTS

The current study included 90 elderly incidentally diagnosed anaemic patients. The mean age of the patients was 66.44±5.87 years. There were 52 (57.8%) males and 38 (42.2%) females, with a male-to-female ratio of 1:3. The mean Body Mass Index (BMI) value was 21.98±2.34 kg/m^2. The most common co-morbidity among anaemic elderly patients was hypertension, which was reported by 35 (38.9%) patients, followed by diabetes mellitus in 29 (32.2%), hypothyroidism in 6 (6.7%), and heart disease in 1 (1.1%) patient. The most common clinical sign was pallor reported in all study population (100%), distribution of patients according to the clinical signs present is depicted in [Table/Fig-1].

Signs		Yes (%)
Pallor		90 (100.00)
Oedema	Pedal	32 (35.6)
	Facial	1 (1.1)
Nail changes	Platynychia	8 (8.9)
	Koilonychia	6 (6.7)
	Clubbing	1 (1.1)
Knuckle pigmentation		26 (28.9)

[Table/Fig-1]: Distribution of patients as per signs.

[Table/Fig-2] shows different aetiologies of anaemia among elderly patients with anaemia.

The association between gender and laboratory parameters was studied. In current study, the BMI was significantly higher in males compared to females (p-value=0.016). While all other parameters studied did not differ significantly between the groups. In general population, females had more prevalence of anaemia as compared to males but this difference is not evident in elderly in the present study. The means of laboratory parameters according to gender with respective p-values are shown in [Table/Fig-3].

Types of anaemia	n (%)
Iron deficiency	53 (58.9)
Megaloblastic	24 (26.7)
Dimorphic	13 (14.4)
Total	90 (100)

[Table/Fig-2]: Distribution of patients as per type of anaemias.

Parameters	Normal values	Female (n=38)	Male (n=52)	p-value
		Mean±SD	Mean±SD	
BMI	18.5-24.9 kg/m^2	21.30±2.69	22.48±1.92	0.016*
Haemoglobin	13-17 gm/dL	8.66±2.16	8.34±2.12	0.484
White Blood Cells (WBC)	4000-10000/cumm	8171.05±4150.08	7388.46±3281.48	0.321
Red Blood Cells (RBC)	4.5-5.5 millions/cumm	3.67±0.99	3.71±0.92	0.868
Platelet count	1.5-4.5 lakh/cumm	2.38±1.22	2.26±1.11	0.625
RDW	11.6-14	16.87±5.18	17.80±6.31	0.460
Packed cell volume	40-50%	28.86±7.28	28.27±6.30	0.682
MCV	83-101 fL	80.61±17.27	81.86±19.77	0.757
MCH	27-32 pg	25.91±6.01	26.90±6.36	0.458
MCHC	31.5-34.5 g/dL	31.69±2.01	37.27±45.96	0.457
Serum iron	65-175 µg/dL	38.41±29.34	40.39±24.37	0.728
Serum ferritin	21.81-272.66 ng/mL	107.26±179.61	131.12±287.54	0.653
Saturation	20-50%	19.86±11.02	19.69±10.03	0.940
TIBC	250-450 ug/dL	283.66±77.71	304.48±71.75	0.193
Vitamin B12	187-883 pg/mL	283.58±286.10	222.39±84.72	0.1479

[Table/Fig-3]: Association of gender with haematological and biochemical parameters. BMI: Body mass index; RDW: Red cell distribution width; MCV: Mean corpuscular haemoglobin; MCH: Mean corpuscular haemoglobin; MCHC: Mean corpuscular haemoglobin concentration; TIBC: Total iron binding capacity

Present study noted the diet pattern of the study population, among the 90 patients, 57 (63.3%) consumed a mixed diet, and 33 (36.7%) were vegetarians. The laboratory parameters were compared between the groups based on diet pattern and is presented in [Table/Fig-4]. The present study found significant increases in BMI (p-value=0.027), MCV (p-value <0.0001), MCH (p-value <0.0001) and serum iron (p=0.002), while a significant decrease in platelet count (p-value=0.001) and vitamin B12 (p-value=0.0062) was found in elderly patients consuming a vegetarian diet as compared to patients consuming mixed diet. While all other parameters studied did not differ significantly between the groups. The means of laboratory parameters according to diet with respective p-values are shown in [Table/Fig-4].

Most of the patients who underwent gastroscopy (n=25) had iron deficiency anaemia (80%) [Table/Fig-5]. Stool occult blood test could be done in 67 patients only. It was positive in 21 patients and negative in 46 patients. Colonoscopy could be done in only one patient which showed haemorrhoids. Out of 90 patients, 12 patients underwent ultrasonography. Out of these 12 patients, two patients had hepatomegaly, three patients had splenomegaly, two patients had bilateral mild renal disease, and there were two patients with ascites, one each with incisional hernia, prostatomegaly, bilateral renal parenchymal disease.

Parameters	Mix Mean±SD	Vegetarian Mean±SD	p-value
BMI (kg/m^2)	21.57±2.11	22.70±2.57	0.027*
Haemoblobin (g/dL)	8.47±1.91	8.48±2.49	0.983
White Blood Cell (WBC) (/cumm)	8194.74±3571.04	6896.97±3752.29	0.107
Red Blood Cell (RBC) (millions/cumm)	3.79±0.90	3.52±1.00	0.201
Platelet count (lac/cumm)	2.61±1.20	1.80±0.86	0.001*
RDW	18.20±6.16	16.02±5.06	0.088
Packed cell volume	28.48±5.89	28.58±8.01	0.946
MCV (fL)	74.55±13.93	93.04±20.14	<0.0001*
MCH (pg)	24.60±4.77	29.73±7.07	<0.0001*
MCHC (g/dL)	30.79±1.87	42.03±57.48	0.142
Serum iron (µg/dL)	33.21±20.56	50.51±31.78	0.002*
Serum ferritin (ng/mL)	109.39±184.86	141.17±330.15	0.559
Saturation	18.72±10.93	21.58±9.31	0.211
TIBC (µg/dL)	303.11±74.12	282.88±74.85	0.217
Vitamin B12 (pg/mL)	292.14±233.96	174.49±73.03	0.0062*

[Table/Fig-4]: Association of type of diet with haematological and biochemical parameters.
BMI: Body mass index; RDW: Red cell distribution width; MCV: Mean corpuscular haemoglobin; MCH: Mean corpuscular haemoglobin; MCHC: Mean corpuscular haemoglobin concentration; TIBC: Total iron binding capacity

Gastroscopy findings	Iron deficiency anaemia	Dimorphic anaemia	Megaloblastic anaemia
Gastritis	9	3	
Oesophageal ulcer	1		
Normal	4	1	1
Oesophageal varices	1		
Duodenal ulcer	1		
Hiatus hernia	2		
Peptic ulcer	2		

[Table/Fig-5]: Shows upper gastroscopy findings.

DISCUSSION

Anaemia can affect people of any age, but older people are more vulnerable because the prevalence of anaemia increases with age, reaching nearly 50% in elderly men, and will continue to increase as the population ages [10-13]. Currently, it is believed that anaemia in the elderly is a pathologic condition brought on by underlying illnesses. Anaemia is therefore no longer regarded as an age-related condition and shouldn't be associated with senescence [14,15]. Anaemia affects 39% of elderly people worldwide who are 60 years of age or older, but it affects 54.1% of people in Asia [16].

The current study, aimed to assess laboratory parameters among elderly patients with incidentally detected anaemia. A total of 90 elderly patients with incidentally detected anaemia were included; their average age was 66.44±5.87 years, their BMI was 21.98±2.34 kg/m^2, and there were 1.37 times as many men as women among them. Choi CW et al., in their study found that 13.6% of the 1254 elderly subjects were anaemic [17]. Anaemia was found in 35.3% of cases among the elderly population, according to Krishnapillai A and Omar MA [18].

In the current study, pitting pedal oedema was second most common sign (35.6%), after pallor which was seen in all patients (100%), 1.1% of people had facial oedema. Palpitations, anorexia, and fatigue were listed as the top three symptoms by Bhasin A et al., in their study. Age-related nail changes are frequent in the elderly [19]. In present study, nail changes such as koilonychia 6 (6.6%), platynychia 8 (8.8%), clubbing 1 (1.1%) were seen in a small number of patients, while knuckle pigmentation was seen in 26 (28.9%) of elderly anaemic patients.

Since anaemia is frequently caused by iron deficiency, vitamin B12 and/or folate deficiency, chronic illness, and other pathological conditions, its precise characterisation in this population was done in conjunction with an evaluation of vitamin B12 status. According to their aetiologies, anaemias can be divided into four groups: clonal anaemias, nutritional deficiency anaemias, bleeding anaemias, and anaemias that arise because of chronic inflammation and CKD. There are a few cases, though, where no cause was found [20-22]. In the present study, the most common aetiology was IDA, followed by megaloblastic anaemia, dimorphic anaemia, and other forms of anaemia. In contrast the most frequent aetiologies of anaemia, according to Mann S et al., were megaloblastic anaemia, iron deficiency anaemia, and unexplained anaemia [23]. Similar to the current study, Tettamanti M et al., identified iron deficiency as a common cause of anaemia in the elderly along with anaemia of chronic disease [24].

The IDA is the most prevalent nutritional deficiency anaemia. Malnutrition is frequently associated with iron depletion similar to folate deficiency. Malnutrition and subsequent anaemia can result from the gastrointestinal tract's age-dependent functional changes, polypharmacy, and social isolation. Malnutrition can lead to folate deficiency, especially when combined with alcohol abuse. Anticonvulsants and medications like methotrexate are additional causes. Pernicious anaemia, the standard vitamin B12-deficient anaemia, is not common. On the other hand, *Helicobacter pylori* infections, acid-reducing medications, or atrophic gastritis may cause hypochlorhydria, which more frequently results in a syndrome of food-cobalamin malabsorption [21,24,25].

In present study, anaemic elderly females had a significantly lower BMI as compared to males. In comparison to subjects with a mixed diet, the subjects with vegetarian diet had a significantly low platelet count in elderly patients. BMI, MCV, MCH, and serum iron were more in the subjects consuming vegetarian diet in comparison with those consuming mixed diet. Unlike the current study, which found no significant differences in haemoglobin levels between elderly males and females, Kim HS and Lee BK reported significantly lower mean haemoglobin levels in females than in males [11]. Men's haemoglobin levels declined more noticeably than women's, according to Salive ME et al., [26].

Reduced quality of life, dementia, insomnia, low mood, and cardiovascular disease are all risks that are increased by low haemoglobin levels. Additionally, impaired physical and executive functions are associated with anaemia. People with low haemoglobin levels are more susceptible to fractures and falls. Anaemia is also closely related to longer hospital stays and more frequent admissions [21]. Even mild anaemia is strongly linked to poor clinical outcomes; it should receive clinical attention rather than simply being considered a normal part of ageing [27]. In this study, out of 90 patients, 12 patients underwent ultrasonography. Out of these 12 patients, two patients had hepatomegaly, three patients had splenomegaly, two patients had bilateral mild renal disease, and there were two patients with ascites, one each with incisional hernia, prostatomegaly, bilateral renal parenchymal disease. In current study, out of 90 patients 25 underwent upper gastrointestinal scopy. Majority of these patients had IDA. The commonest finding on scopy was gastritis. Stool occult blood test could be done in 67 patients only. It was positive in 21 patients and negative in 46 patients.

Limitation(s)

Detailed anaemia evaluation could not be done as patients were incidentally detected anaemia. Larger multicentric studies to evaluate causes of anaemia in elderly will help in future to effectively prevent, diagnose and treat elderly with anaemia.

CONCLUSION(S)

In the present study, the proportion of older adults with incidentally discovered anaemia was significant. Anaemia from iron deficiency was the main reason. Anaemia is considered to be an important prognostic factor for several illnesses. The present study highlights the significant underdiagnosis of anaemia in the older population. Therefore, it is advised that aged patients should undergo routine anaemia screening and assessment in order to ensure early diagnosis and prompt management to reduce morbidity and death.

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