

## Biochemical and Haematological Profile of Elderly Anaemic Patients

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**Abstract:** The present study was conducted in a tertiary care hospital over a period of 18 months from October, 2014 to March, 2016. A study of clinical, biochemical and haematological profile of elderly anaemic patients in a tertiary care centre. Two hundred and seven elderly patients diagnosed as anaemic as per WHO criteria were included in the study. Maximum number of cases from the age group of 60-65 years. Identifying and categorizing anaemia is essential to direct the investigation towards the underlying etiology and to guide the clinicians for appropriate targeted treatment. Chronic blood loss was one of the contributing factor for iron deficiency anaemia.

## INTRODUCTION

Anaemia in the elderly is an extremely common problem that is associated with increased morbidity and poor health related quality of life, regardless of the underlying cause (Vanashe and Berliner, 2010). Using World Health Organization (WHO) criteria for anaemia, the prevalence is found to range from 8-44% with the highest prevalence in men 85 years of age and older (Beghe *et al.*, 2004). As reported in the Indian cross-sectional studies, the prevalence varies between 6% and 30% among males and between 10 and 20% among females. In elderly person, etiology of anaemia differs significantly from younger adults and can have severe complications. It is easy to ignore anaemia in elderly since symptoms like fatigue, weakness or shortness of breath may be attributed to ageing process itself. However, anaemia should not be accepted as an inevitable consequence of ageing (Shrivastav *et al.*, 2013). In India, the death rate is declining thus there is significant rise in the elderly population. Several studies world wide have shown high prevalence of anaemia in elderly having a negative impact on function as well as the quality of life

(Olivares *et al.*, 2000). Despite anaemia being an extremely common and significant problem in the elderly, it often remains under-diagnosed and is not reported because it is mostly perceived as a mere consequence of ageing. The failure to diagnose and investigate anaemia in them may lead to delayed diagnosis of potentially treatable conditions.

Therefore, it becomes all the more significant to look for type and severity of anaemia and its etiopathogenesis in order to plan for better prophylactic and management strategies. Though, the prevalence of anaemia in the elderly is high and the size of elderly population is increasing, very few studies have examined the effects of anaemia in elderly patients, especially in India. Hence, this study was an honest effort to evaluate characteristics of anaemia in elderly and correlate various possible etiopathogenesis and clinical presentations in the elderly patients attending our tertiary care hospital.

**Aim:** A study of clinical, biochemical and haematological profile of elderly anaemic patients in a tertiary care centre.

**Objectives:** To analyse the hematological, biochemical characteristics of anaemia seen in elderly patients attending tertiary care hospital. To correlate hematological findings with etiopathologies of anemic patients. To study morphological types of anaemia occurring among elderly in the age group of 60 years and above.

**Literature review:** The word “Anaemia” is derived from Greek word an = negative and haima = blood, however, it is a misnomer as without blood life is not possible (Dorlands, 1994). In 1907, Arneeth discovered that neutrophils in pernicious anaemia were larger and contain more nuclear lobulation than normal (Meyers and Miller, 1984).

Freedman (1982) proposed an approach based on hemoglobin content and red cell size and classified anaemia morphologically into microcytic hypochromic, normocytic normochromic and macrocytic normochromic anaemia. Penninx *et al.* (2006) studied the association between anaemia in the old age, increased mortality and hospitalization. Among 3607 participants, 451 were anemic and the follow-up period showed that, the anaemic patients were more likely to succumb to mortality (37%) than the non-anemic (22%) and also that, the anemic patients were more often hospitalized (65.9%) than the non-anemic (54.1%). The process of hematopoiesis begins in the yolk sac (embryonal stage) at 3rd week of intrauterine life. From 3rd month onwards hematopoiesis starts in the liver which continues upto 6th months. Bone marrow starts taking over the function of hematopoiesis from 4th month onwards and at birth the bone marrow virtually is the only source of blood cells.

A chronic disease is one that lasts for 3 months or more. Anaemia of chronic illness includes any inflammatory, infectious or malignant disease of a long-standing nature viz rheumatoid arthritis, hypertension, cancers, Chronic Kidney Disease (CKD), epilepsy, chronic hepatitis, chronic respiratory diseases, heart disease or diabetes mellitus. Anaemia of chronic disease is the most common form of anaemia in the elderly (Tettamanti *et al.*, 2010).

Peripheral Smear (PS) demonstrates two characteristic features- hypersegmented neutrophils and macro-ovalocytes. Severity of anaemia is variable. There is leukopenia, usually of neutrophils. Thrombocytopenia is of variable degree and platelets are between 50,000-1,00,000  $\mu$ L. Reticulocyte count is decreased. Bone marrow findings: Megaloblastosis is the initial marrow change, present even before macrocytosis appears in peripheral blood. Marked erythroid hyperplasia with reversal of M:E ratio upto 1:8. The hallmark in marrow is nuclear-cytoplasmic maturation dissociation especially seen in erythroid series (Singh, 2011). Leukemia is a common among elderly malignancies. Chronic

Lymphocytic Leukemia (CLL) represents the majority, with a peak incidence at the age of 60 years. Acute Myeloid Leukemia (AML) is the most common acute leukemia seen in the elderly (Juliusson *et al.*, 2009). Genetic and environmental factors, viral infections and immunodeficiency are the predisposing factors of leukemia in the elderly. Anaemia occurs in leukemia because of marrow infiltration by leukemic cells resulting in bleeding due to thrombocytopenia or erythroid failure or in part due to decreased survival of erythrocytes. Red cells in these anaemias are usually normocytic. Autoimmune phenomenon is a well-known complication of lymphoproliferative diseases and in particular of CLL. Three autoimmune hematological conditions frequently associated with CLL are, auto immune hemolytic anaemia, immune thrombocytopenia purpura and pure red cell aplasia. Of these, auto immune hemolytic anaemia is the most common. Elderly males with active CLL are more prone to these (Mauro *et al.*, 2000). All chronic infections can cause anaemia. The high prevalence of infectious diseases worldwide makes it a significantly important cause for anaemia. The most common infections causing anaemia are associated with chronic inflammation of female genital tract, urinary tract, lung abscess, suppurative bronchiectasis, pneumonia, tuberculosis, malaria, osteomyelitis and HIV.

## MATERIALS AND METHODS

The present prospective study was conducted in a tertiary care hospital, over a period of 18 months from October, 2014 to March, 2016. The study was approved by Ethics and protocol committee. All samples were screened and the cases having anaemia and those who were above 60 years of age were included in the present study after taking proper consent.

## RESULTS AND DISCUSSION

The present study was prospective and cross-sectional study carried out over period of 18 months which included 207 anemic elderly patients in age group of 60 years and above attending our tertiary care hospital.

The study subjects were divided using the WHO criteria for severity of anaemia. Most of the study population presented with moderate grade anaemia (47.8%) followed by mild grade (38.2%) and severe grade (14.0%) anaemia (Table 1).

Table 2 shows frequency of various presenting symptoms in anemic patient in the present study. The most common presenting symptom in the present study was generalized weakness and low appetite (89.9%) followed by fatigue (85.5%). Pearson-Chi square test was used to test association of presenting symptoms and grades of anaemia (Table 3).

Table 1: Grades of anaemia among study subjects

Grade	Number	Percentage
Mild	79	38.2
Moderate	99	47.8
Severe	29	14.0
Total	207	100.0

Table 2: Frequency of presenting symptoms in anemic patients

Symptoms	Number	Percentage
Generalized weakness	186	89.90
Fatigue	177	85.50
Giddiness	81	39.10
Headache	19	9.20
Anorexia	186	89.90
Weight Loss	60	29.00
Dysphagia/Dyspepsia	4	1.90
Nausea/Vomiting	106	51.20
Fever	20	9.70
Dyspnoea	170	82.10
Oedema	3	1.40
Cough/Cold	73	35.30
Pain in Abdomen	158	76.30
Bleeding manifestations	9	4.34

Table 3: Association of presenting symptoms and grades of anaemia

Symptoms	$\chi^2$ -statistic	p-values	Significance
Generalised weakness	0.9	0.6	Not significant
Fatigue	12.1	0.001*	Significant
Giddiness	1.4	0.5	Not significant
Headache	4.8	0.1	Not significant
Low Appetite	1.0	0.6	Not significant
Weight Loss	1.4	0.5	Not significant
Dysphagia/Dyspepsia	0.5	0.8	Not significant
Nausea/Vomiting	4.1	0.1	Not significant
Fever	4.9	0.1	Not significant
Dyspnoea	8.8	0.001*	Significant
Oedema	0.7	0.7	Not significant
Cough/Cold	5.4	0.1	Not significant
Pain in abdomen	4.5	0.1	Not significant
Bleeding manifestations	1.7	0.4	Not significant

As shown in Table 2, there was a significant association observed between severity of anaemia and dyspnoea and fatigue with  $p < 0.05$  for both. This shows that severity of anaemia was higher in subjects presenting with dyspnoea and fatigue. Similarly no significant association was found between other presenting symptoms and severity of anaemia.

The present study was specifically aimed at analyzing the hematological and clinical characteristics of elderly anaemia and investigating the etiology of anaemia in elderly patients attending our tertiary care hospital. In present study, a total of 207 cases of anaemia were studied in the elderly patients (i.e., age above 60 years) attending our tertiary care hospital. For selection of anaemia cases, WHO criteria was applied. The diagnosis of anaemia was established by clinical examination and supplemented by appropriate hematological investigations, i.e., Hb, TLC, MCV, MCH, MCHC, RBC count, PCV, RDW, RETIC, ESR and Platelet count, BT, CT, PT and INR. An attempt has been made by carrying

out special laboratory investigations (wherever required) along with clinical correlation, so as to approach precise diagnosis in specific types of anaemia.

## CONCLUSION

The incidence of anaemia is quite high among elderly patients, more so when associated with chronic diseases and malignancies. The non-specific symptoms of generalized weakness, easy fatigability and concomitant anaemia should not be regarded as a result of 'normal aging'. Identifying and categorizing anaemia is essential to direct the investigation towards the underlying etiology and to guide the clinicians for appropriate targeted treatment. Despite modern diagnostic advances, elderly anaemia still remains under reported and inadequately investigated. There is clearly a need for greater awareness of anaemia in the elderly and of its significance in terms of poorer outcomes, prolonged hospital stay and increased mortality. The present study illustrates the value of regular monitoring and patient evaluation of the etiological causes of anaemia in the elderly, enabling adequate and effective treatment to be allowing timely.

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