

## RESEARCH ARTICLE

### UNDIAGNOSED ANEMIA AMONG HOSPITALIZED ELDERLY PATIENTS.

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**ABSTRACT: Background and aim:** All over the world, anemia is one of the most common blood disorder associated with several health problems including low physical and cognitive performance, worse clinical outcomes and increased risk of morbidity and mortality especially among elderly hospitalized patients. The current study aimed to assess the prevalence of previously undiagnosed anemia among hospitalized elderly patients who aged 60 years and older. **Method:** This study is a prospective population-based observational study of all elderly patients admitted at King Abdul-Aziz hospital in Taif city of Saudi Arabia. The study conducted from January 2020 to January 2021. A total of 66 elderly patients who have newly diagnosed as anemic and agreed to participate in the study were investigated to confirm their diagnosis with anemia. **Results:** The results of this study showed that 66 of hospitalized elderly patients were detected with low hemoglobin level and never diagnosed previously. Low MCV and Low MCH were detected in the results of 21 anemic patients. Thus, these patients were identified with microcytic hypochromic anemia. Moreover, the serum iron level for those patients were investigated and showed low result compared to control individuals. **Conclusion:** High number of elderly patients who, admitted to the hospital at the study period were newly diagnosed with anemia, out of those 31.8% were reported with microcytic hypochromic anemia. This study suggested that regular clinical checkup and early diagnosis of anemia among elderly are important factors to reduce or prevent the incidence of many serious health problem associated with this disorder.

**KEYWORD:** Anemia, Undiagnosed, elderly, Hospitalized patients, Saudi Arabia.

### INTRODUCTION:

Anaemia is a serious public health problem in developing and developed countries, affecting around 2.2 billion (33%) of people worldwide<sup>[1]</sup>. Anaemia is defined by the World Health Organization (WHO) as haemoglobin (Hb) below 120 g/L in women (normal range 12- 16 HB%) and below 130 g/L in men (normal range 13.5-17.5

HB%). According to the statistical data reported from the WHO, 24% of elderly are affected with anaemia<sup>[2]</sup>. Among elderly the most common cause of anaemia is iron deficiency, which might result from some anti-inflammatory treatment, colon cancer, long-lasting gastrointestinal (GI) blood loss, ulcer and bleeding disorders. Moreover, elderly

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patients may become deficient with iron as a result of abnormal iron absorption or inadequate iron intake. Anaemia caused as a result of iron deficiency without blood loss will take many several years to develop<sup>[3]</sup>. It has been found that multiple factors work together and increase the risk of developing anaemia in elderly in most of cases<sup>[4]</sup>. However, unknown and unclear cause of anaemia was reported in a study among 30% of elderly population<sup>[5]</sup>. Several harmful health consequences were detected among elderly that may lead to reduced muscle strength, exacerbation of associated disease conditions and impaired cognition<sup>[6,7]</sup>. In addition, elderly patients who diagnosed with anemia have been reported with a reduced physical performance, falling to more frequent hospitalization and in severe cases even have a high risk of death<sup>[8,9]</sup>.

Frequently, anaemia among elderly who aged 65 years or older is not detected or diagnosed early since it is mostly noticed as a disease sign or consequence of aging<sup>[10]</sup>. In Italy, the prevalence of anaemia among elderly patients who aged older than 65 years was 19% and they are often classified as a mild case despite the clinical importance<sup>[11]</sup>. The prevalence of anaemia is higher in older patients of both genders, 42% among person above the age of eighty. In United states it has been found that the prevalence of anemia increase significantly with aging and reach more than 20% in elderly population who aged 85 years and older<sup>[12]</sup>.

Another study found that the prevalence of anaemia was 31.1% among old population<sup>[5]</sup>. Within the same study, it has been reported that 1,243 out of 8,744 elderly persons were anaemic with a considerably higher frequency in men than in women<sup>[5]</sup>. In Holmsted County, the prevalence of anaemia highly reported in elderly men and women with 20.5% and 15.9% respectively<sup>[13]</sup>. A higher anaemia incidence in female (14.7%) than in male (9.9%) was detected in a study performed among Korean people aged 60 to 95 years<sup>[13]</sup>. Similar results were shown in Japanese people aged 51 to 80 years where anemia prevalence was relatively higher among female (17.1%) than male (14.5%)<sup>[14]</sup>. It has been shown that 23.9% of the

elderly population worldwide suffers from anemia<sup>[2]</sup>. In Saudi Arabia, a study was performed at Riyadh city found that 13% of male and female elderly patients were anaemic according to their haematological indices<sup>[15]</sup>. Despite the high prevalence, anemia does not have proper medical consideration and early diagnosis, detection and management. Moreover, there are no studies performed previously on elderly hospitalised patients to detect the prevalence of undiagnosed anaemia in Saudi Arabia. Thus, the aim of this study was to assess the prevalence of undiagnosed anaemia among hospitalized elderly patients who aged 60 years and above.

## **MATERIAL AND METHODS:**

The current study is a prospective population-based observational study of all elderly patients admitted at King Abdul-Aziz hospital in Taif city at the Western region of Saudi Arabia. The study conducted from January 2020 to January 2021 to determine the prevalence of previously undiagnosed anaemia in elderly male and female aged 60 years or older. The study participants were elderly patients admitted to hospital due to symptoms and signs such as fatigue, paleness, dyspnoea, abdominal pain, back pain, infection or trauma. However, patient diagnosed with anaemia previously or had chronic diseases such as diabetic, renal disease or GIT disorders were excluded from this study.

## **LABORATORY INVESTIGATION:**

Venous blood samples from admitted elderly patients were collected by venepuncture in EDTA tube, contains Ethylenediaminetetraacetic acid that works to prevent clotting. Complete blood count (CBC) was determined by using Sysmex XN-1000™ Haematology Analyzer (Germany). Complete blood count was performed for all patients' sample in duplicate to confirm their results and their diagnosis with anemia. Samples were run during a short period of time following collection to avoid any delay effects on test results. Once the haemoglobin level

was below WHO reference criteria for anaemia, further laboratory investigation of serum iron was made. Blood samples were collected in the plain tube with no any additives to investigate the serum iron level. ARCHITECT c8000 (Abbott) was used to investigate the iron level in blood quickly and accurately. Moreover, these clinical laboratory tests were performed to five samples of healthy individuals (control group) who were non-anaemic and matched for age and sex.

#### DATA ANALYSIS:

Microsoft Office Excel used for manually entered of data, which then analyzed by Statistical Package of Social Sciences (SPSS), version 16.0. (IBM Corporation, Armonk, NY, USA).

#### ETHICAL CONSIDERATION:

Ethical approval for this study was obtained from the ethics review committee of Applied Medical Sciences College at Al-Taif University as well as the ethical committee of the ministry of health (Approval number 505). The aim of this study was explained to each patients and oral agreements were taken to publish their data without their names or any personal information. All information obtained at each course of the study was kept confidential.

#### RESULTS:

This is a prospective population-based observational study performed at King Abdul-Aziz hospital in Taif city at the Western region of Saudi Arabia during the period from January 2020 to January 2021. The study aimed to assess the prevalence of previously undiagnosed anemia between male and female, Saudi and non-Saudi hospitalized elderly patients. The results of 66 patients who aged 60 years or older were included in this study. All study's participants were newly diagnosed with anemia while they are hospitalized. All the study's participants were admitted to hospital due to different symptoms and signs such as fatigue, paleness, dyspnea, abdominal pain, back pain, infection or trauma. However,

patients diagnosed with anemia previously or had chronic diseases such as diabetic or renal failure were excluded from the study.

The majority 85% (n=56/66) of study participants were Saudis and 48.5% (n=32/66) were male. More than half of patients included in this study were between the age 76 to 95 years 53% (n=35/66) and 39% (n=26/66) were 60 to 75 years, while only five (8%) patients were above 95-year-old (Table 1).

**Table 1: General characteristics of participants of this study**

Sex	(Number and Percentage)
Male	32 (48.5%)
Female	34 (52.5%)
Nationality	
Saudi	56 (85%)
Non-Saudi	10 (15%)
Age	
60-75	26 (39%)
76-95	35 (53%)
>95	5 (8%)

The most common reason for elderly patients admitted to the hospital was the abdominal pain followed by chest pain.

The results of this study showed that 66 of hospitalized elderly patients were anemic and never diagnosed previously. Those elderly patients were detected with Hb concentration lower than the normal level according to WHO criteria (World Health Organization, 2012) thus, they diagnosed as anemic. In addition, low level of red blood cells was reported in all patients with low Hb concentration. Out of 66 patients newly diagnosed with anemia there was 21 anemic patients 31.8% (n=21/66) had microcytic (low MCV: normal range 80-97 fl) hypochromic (low MCH: normal range 27-32 pg) RBCs during the period of this study. Thus, these patients were expected to have microcytic hypochromic anemia. In addition, the iron level for those patients were found to be lower than the normal range (11.6-31.3  $\mu\text{mol/l}$ ). The CBC results as well as

serum iron level of five healthy individuals (control group) were normal.

## **DISCUSSION:**

All over the world the number of elderly people has been grown rapidly. According to the WHO 1,243 out of 8,744 elderly were noticed to be anemic with a considerably higher frequency in men than in women<sup>[5]</sup>. Anemia is a common health problem in elderly patients and associated with many health complications. Anemia should not be accepted as an inevitable consequence of aging. It should always be investigated and treated early to reduce or prevent the related serious health problems. Among elderly, anemia has found to be associated with many health problems and its diagnosis not usually easy thus, it must always be taken in to consideration for many reasons. First, diagnosis of anemia among patients over the age of 60 is not easy because it's symptoms mostly reported as a consequence of aging or as a disease marker such as fatigue, listlessness, paleness, generalization, and lack of energy<sup>[16]</sup>. In addition, some elderly patients suffer from chronic diseases such as diabetes, kidney or GIT diseases and this type of disease affects the hemoglobin production level and affects iron synthesis and production causing anemia. The diagnosis of anemia typically based on laboratory results. Hence utilization of the various laboratory tests play an important role for the diagnosis of anemia and to determine its type. In this study, hematologic and biochemistry laboratory investigations were used to confirm the diagnosis with anemia.

A total of 66 elderly patients admitted to the hospital during the period of the study were newly diagnosed with anemia, out of those 31.8% diagnosed with microcytic hypochromic anemia. In the United States, it has been reported that the incidence of anemia increases with age, especially in people over the age of 65. It has been shown that 23.9% of the elderly population worldwide suffer from anemia<sup>[2]</sup>. Elderly patients in this study were suffering from low levels of hemoglobin, RBCs and serum iron. In

addition, the results of this study showed low level of MCV and MCH which, confirm the presence of microcytic hypochromic anemia. A recent study (2021) showed similar results among elderly patients age 60 years and older with common pattern of microcytic hypochromic RBCs as a result of iron deficiency<sup>[17]</sup>. Elderly anemic patients were reported in another study with a mean age of 82 years the male patients had the mean hemoglobin values 10.7g/l for male and 10.2g/l for female. Other study performed in Japan has been found that the prevalence of anemia tends to be moderately high among men and women aged 51 to 80 years<sup>[14]</sup>. Lucca and colleagues found that the prevalence of anemia was 31.1% among old population with a considerably higher frequency in men than in women<sup>[5]</sup>. On the other hand, IDA was found to be more common in women than in men in the United Arab of Emirati (UAE) population in 2014<sup>[18]</sup>. Similarly, the current study found that more women (51.5%) were diagnosed with anemia than men (48.5%). However, this was not statistically significant difference between the two genders. The proportion of previously undiagnosed anemia cases among hospital admitted elderly patients was high in this study, as it had been in previous studies in elderly in Italy<sup>[11]</sup>, in Korea<sup>[13]</sup>, in Japan<sup>[14]</sup> and in UAE<sup>[18]</sup>.

## **STUDY LIMITATIONS:**

This study has several numbers of limitations including the period of the study which, was a year. It is also expecting low number of elderly hospitalized patient's science the special situation of Corona virus CVID-19. Moreover, this study done in one hospital at Taif city. Lastly, more laboratory tests are needed to confirm the diagnosis with anemia as well as to determine the type of this disorder.

## **CONCLUSION:**

Since, the highly number of previously undiagnosed anemia among hospitalized elderly, who were not aware of their anemic disorder in this study. Therefore, this study suggested that regular clinical



checkup and early diagnosis of anemia among elderly are important factors to reduce or prevent the incidence of many serious health problems associated with this disorder. Moreover, improving the life style and diet habit and intake of oral iron supplementation might be useful for elderly following consulting a doctor.

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#### REFERENCES

- [1]. Beghé C, Wilson A, Ershler WB. Prevalence and outcomes of anemia in geriatrics: A systematic review of the literature. *Am J Med.* 2004.
- [2]. Organisation WH. Worldwide prevalence of anaemia 1993–2005. WHO Global Database on Anaemia. *WHO Rep.* 2005.
- [3]. Jimenez K, Kulnigg-Dabsch S, Gasche C. Management of iron deficiency anemia. *Gastroenterol Hepatol.* 2015;11.
- [4]. Eisenstaedt R, Penninx BWJH, Woodman RC. Anemia in the elderly: Current understanding and emerging concepts. *Blood Rev.* 2006;20.
- [5]. Tettamanti M, Lucca U, Gandini F, et al. Prevalence, incidence and types of mild anemia in the elderly: The “Health and Anemia” population-based study. *Haematologica.* 2010;95.
- [6]. Anpalahan M, Savvas S, Lo KY, et al. Chronic idiopathic normocytic anaemia in older people: the risk factors and the role of age-associated renal impairment. *Aging Clin Exp Res.* 2017; 29:147–155.
- [7]. Andrès E, Serraj K, Federici L, et al. Anemia in elderly patients: New insight into an old disorder. *Geriatr Gerontol Int.* 2013.
- [8]. Penninx BWJH, Guralnik JM, Onder G, et al. Anemia and decline in physical performance among older persons. *Am J Med.* 2003;115.
- [9]. Culleton BF, Manns BJ, Zhang J, et al. Impact of anemia on hospitalization and mortality in older adults. *Blood.* 2006;107.
- [10]. Kikuchi M, Inagaki T, Shinagawa N. Five-year survival of older people with anemia: Variation with hemoglobin concentration. *J Am Geriatr Soc.* 2001;49.
- [11]. Beutler E, Waalen J. The definition of anemia: What is the lower limit of normal of the blood hemoglobin concentration? *Blood.* 2006.
- [12]. Guralnik JM, Eisenstaedt RS, Ferrucci L, et al. Prevalence of anemia in persons 65 years and older in the United States: Evidence for a high rate of unexplained anemia. *Blood.* 2004;104.
- [13]. Ania BJ, Suman VJ, Fairbanks VF, et al. Prevalence of anemia in medical practice: Community versus referral patients. *Mayo Clin Proc.* 1994;69.
- [14]. Yamada M, Wong FL, Suzuki G. Longitudinal trends of hemoglobin levels in a Japanese population—RERF’s adult health study subjects. *Eur J Haematol.* 2003;70.
- [15]. Alsaeed AH. An analysis of hematological parameters to assess the prevalence of anemia in elderly subjects from Saudi Arabia. *Genet Test Mol Biomarkers.* 2011;15.
- [16]. Mathew KK, Vakharia RM, Salem HS, et al. Is iron deficiency anemia a risk factor for poorer outcomes in primary total knee arthroplasty? *J Arthroplasty.* 2020;35.
- [17]. Munesh, Mittal V, Arora S, et al. Patterns of anaemia in elderly patients in relation with RBC indices. *Int J Curr Res Rev.* 2021;13.
- [18]. Al-Dabbagh B, Shawqi S, Yasin J, et al. Half of the Emirati population has abnormal red cell parameters: Challenges for standards and screening guidelines. *Hemoglobin.* 2014;38.

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