



Anemia-an Unnoticed Entity in Asian Males A Focus on the Anemic Parameters of Adult Males in Pakistan

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Authors' contributions

This work was carried out in collaboration between all authors. Author AN designed the whole study and wrote the manuscript. Authors SSK and FB helped in data collection. Authors JA and SMM supervised the research. All authors read and approved the final manuscript.

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ABSTRACT

Background: There is a general lack of awareness that anemia could be present in a significant number of apparently healthy adult males which might then lead to a misdiagnosis and a prolonged suffering of the patient. This study questions the frequency of anemia in healthy adult males which if found high will be an eye opener and an alarm for the doctors.

Aims: This study was to determine the extent of anemia and its related parameters in apparently healthy adult males of a general population.

Study Design: A cross sectional, observational study.

Place and Duration of Study: The research was done in a tertiary care hospital, Creek General Hospital, Karachi from May 2016 to August 2016.

Methodology: we included 493 healthy adult males by convenient sampling. The exclusion criteria included males less than 18 years or with any organ insufficiency, terminal illness or blood dyscrasias or hemoglobinopathies. Complete Blood Count was done to mark anemia and to

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assess its severity. The Mean Corpuscular Volume was categorized as normocytic, microcytic, and macrocytic. The data was analyzed on SPSS version 20.

Results: Out of the 493 males, 238(51.4%) were anemic out of which 114 (47.8%) were normocytic, 98(41.1%) were microcytic and 26(11%) were macrocytic (P=0.00). The severity of anemia among the 238 anemic males showed 164(69%) males to have mild anemia, 44(18.4%) to have moderate and 30(12.6%) to have severe anemia. (P=.000). The mean hemoglobin in males is 12.5 (STD±2.4). In younger age group (<30 years) of 210 males, 102 (42%) were anemic. In the middle age group (31- 50 years), out of the 165 that presented 76 (46%) were anemic while 118 patients in the elderly age group (> 50 years), 60 (51%) had anemia (P=0.72). There were 45 diabetic males, out of which 27(60%) were anemic and among them 20 had mild (74%) anemia and 18 (67%) were normocytic (P=0.049). In accordance to ethnicity, in decreasing order, 60% of Sindhis, 54% of Pashtuns, 51% of the Urdu speaking sector, 51% of Bengalis, 46% of Gilgitis, 35% of Punjabis and 22% of Balouchis were anemic (p=0.04). 49% of Muslims, 35.7% of Christians were anemic. 168 were smokers in which 72 (42.8%) were anemic (P=0.132) with 46% being normocytic and 33% being microcytic. Logistic regression did not show any correlation between hemoglobin and age in the study.

Conclusion: Anemia is highly prevalent in the adult males- a fact which has remained unnoticed.

Keywords: Anemia; hemoglobin; males; erythrocyte indices.

1. INTRODUCTION

Anemia is a manifestation of an underlying deficiency or illness and its timely identification in apparently healthy individuals could lead to diagnosis of potentially treatable conditions which would otherwise eventually cause significant morbidity or mortality in the future [1]. Anemia when present significantly in a population can directly affect the gross productivity of that population as they will not be able to efficiently contribute as a workforce and hence retarding the economic growth with a loss of Gross Domestic Product. Furthermore, anemia causes a mental deterioration with time which will further slow down human development, education and quality of life [2]. Lack of micronutrients leading to anemia has cost a heavy burden on Pakistan which spends estimated three billion dollars on diseases due to micronutrient deficiencies [3]. Anemia is a worldwide health issue with its overall global prevalence in 2010 to be 32.9% [4] which has only fell by 0.2 to 0.3 percentage points per year between 1993 and 2013 [5].

The high incidence of anemia in females is a globally accepted fact. However, it is overlooked that apparently healthy males may also be suffering from anemia a truth not much considered. This study is to determine the extent of anemia and the related parameters in adult males of the general population who are not suffering from any organ insufficiency.

2. METHODOLOGY

The study design was cross sectional, observational and the research was done in an Outpatient clinic of a tertiary care hospital of Karachi from May 2016 to August 2016. The participants included were 493 males from medical clinics above 18 years. The exclusion criteria was age less than 18 years and any severe organ insufficiency, terminal illness or blood dyscrasias at baseline evaluation. Extensive drug history, past history and family history was taken to exclude any known or possible blood disorders and the CBC report was checked for any suspicion of blood dyscrasias or acute hemolytic conditions like malaria and any such found were not included in the study. The study population was selected using a convenient random sampling technique from the outpatient clinics after their given consent. A questionnaire regarding biographic data and required information was filled. Complete blood picture (CBC) was done by ABX Micros 60 Hematology Analyzer to identify anemia and to assess the severity which was divided into mild, moderate and severe. The Mean Corpuscular Volume (MCV) was checked and accordingly noted as normocytic, microcytic, and macrocytic. The data was analyzed on SPSS version 20.

2.1 Objective Definitions

2.1.1 Anemia (WHO criteria) [6]

Hemoglobin levels in males < 13 g/dl

2.1.2 Severity of anemia [6]

Mild; 10-12.9 g/dl

Moderate; 8.0 - 9.9 g/dl

Severe; <8.0 g/dl

2.1.3 MCV: [6]

Normocytic; 84-96

Microcytic; <84

Macrocytic; >96

3. RESULTS

Out of the 493 healthy adult males, 238 were anemic (51.4%).

Anemia categorized according to the age groups is shown in Table 1.

In accordance to the red cell indices, among the 238 anemic males, 114(47.8%) were normocytic, 98(41.1%) were microcytic and 26(11%) were macrocytic. (P=0.000) The severity of anemia was categorized as mild, moderate and severe and its frequency is shown in Table 2.

Anemia classified with respect to ethnicity is shown in Table 3.

Regarding religion, out of 463 Muslims, 226(49%) were anemic and out of 28 Christians 10 (35.7%) were anemic. The 2 Hindus that presented were anemic (100%).

There were 45 diabetic males, out of which 27(60%) were anemic among them 20(74%) had mild anemia. (P =.06). The anemia was

normocytic in 18 (67%) out of the 27 (P=0.049) diabetic anemic males.

Among the 493 men, 168 were smokers in which 72(42.8%) were anemic (P =0.13).The type of anemia in smokers according to MCV is shown in Fig. 1.

4. DISCUSSION

The statistics of this research confirmed our suspicion that there is a high incidence of anemia among the healthy adult males of this country - a fact which remains unnoticed. A similar study which was done in Peshawar showed anemia to be at the extent of 67.4% in healthy males [7] which is even higher compared to our percentage of 51.4%. However, the Mashhadi and Hedayati study in the neighboring country of Iran [8] found much lower incidence of only 6.2% anemia in adult males while results of a study from Oman [9] showed the frequency of 12% anemia. The presence of anemia in adult males in our region is based on the lack of balanced diet deprived of micronutrients like iron and foliates. Their staple diet mainly consists of carbohydrate and fat lacking required amount of protein and fresh green vegetables. Other causes can be anemia of chronic disease due to chronic illness like diabetes, worm manifestation due to unhygienic conditions, and occult blood loss due to gastro esophageal ulcerations because of spicy food and excessive intake of drugs like painkillers etc. and antibiotic abuse. According to the World Food Program malnutrition is one the major threats to Pakistan where 24% being undernourished or malnourished [10]. The mean hemoglobin reported from Peshawar [7] was 11.6 gm/dl lower than observed in present study 12.5 gm/dl.

Table 1. Anemia present in accordance to the age groups

Age groups	Anemia present (n)(% of the total that presented in that group)	Total presented in that group
Younger age group (18-30 years)	102 (42%)	210
Middle age group (31-50 years)	76 (46%)	165
Old age group (>50 years)	60 (51%)	118
	238	493

P=0.7

Table 2. The frequency of anemia according to severity of anemia

Severity of anemia	Number (n)	Percentage (%)
mild anemia (10-12.9 g/dl)	164	69
moderate anemia (8.0 -9.9 g/dl)	44	18.4
severe anemia (<8.0 g/dl)	30	12.6
Total	238	100

P=.000

Table 3.The frequency of anemia in different ethnic groups

Ethnicity	Anemia present(n)	% of anemics out of the total presented	Total presented in that group
Urdu speaking	130	51	252
Bengalis	14	51	27
Punjabi	37	35	104
Sindhi	24	60	40
Pushto	19	54	35
Gilgit	12	46	26
Balouchi	02	22	09
Total	238	100	493

P=.04

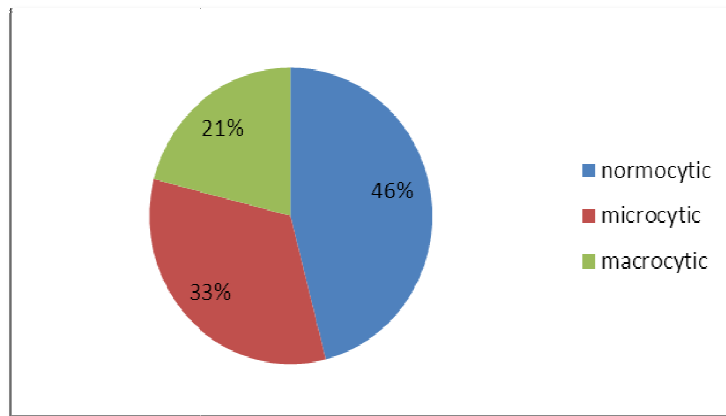


Fig. 1. Type of anemia in smokers according to MCV

(P= .05)

The incidence of anemia increased with increasing age. Anemia in elderly males is more prevalent due to their disturbed diet pattern and lack of a balanced diet. The loss of appetite, malabsorption, malnutrition, presence of gastritis, drug misuse/abuse, the occurrence of co morbid conditions causing anemia of chronic disease are some major reasons for anemia in the elderly group. This fact is seconded by the study of Iran [8] where the elderly males were more anemic than the younger group, and a Brazilian study done on elderly males where the anemia incidence was 10.4% [11]. Patel compared various studies (mainly of USA and Italy) conducted on prevalence of anemia in elderly males and concluded that prevalence of anemia ranged from 9.2% to 23.9% in older men [12].

The statistics showed that the Sindhis, Pashtuns, Urdu speaking and Bengalis are more prone to be anemic (in decreasing order respectively) having a percentage greater than 50% compared to Gilgits, Punjabis and Balouchis where it is less than 50%.The Peshawar study also confirmed Pashtuns to have a high incidence of anemia [7].

Faruk reviewed anemia's prevalence in Bangladesh and stated that the adult males had a prevalence of 68% [13] and emphasized on the lack of iron in diet. Apart from the lack of awareness, availability of balanced diet and malnutrition, the Sindhis, Urdu speaking sector, Pashtuns and Bengalis have a strong inclination towards 'Gutka', tobacco, Niswar, etc. aggravating anemia. Pashtuns also have a tendency towards constipation and hence hemorrhoids causing chronic blood loss. Further extension studies would be needed to evaluate the etiology of anemia according to the specific ethnicity.

When considering religious modality, not only Muslims but Christians also had a significant incidence of anemia. These findings reconfirm that the anemia is linked essentially to our dietary habits and lifestyle structure that is particular to this region. The two Hindus in the study were anemic which could be due to religious norms of dietary constraints. However, Milan argued in his Indian study that the prevalence of anemia in Hindus and Non Hindus was similar [14].

Majority of healthy adult males in the present study group presented mild form of anemia which could be due to dietary deficiency of micronutrients and can be corrected by targeted dietary management.

The Peshawar study points mild anemia is more common in males [7]. Italian study points mild anemia is common in elderly males [15]. But Indian study by Milan indicates, mild anemia is prevalent in all age group healthy individuals [14].

The results of red cell indices showed prevalence of both normocytic and microcytic form of anemia pointing to the fact that the major cause of concern is the lack of nutrients in diet particularly iron, chronic/occult blood loss due to ulcerations, the excessive consumption of tea and coffee hindering iron absorption. The Peshawar [7], and Indian study are showing normocytic anemia to be more prevalent in males. [16] The presence of macrocytic anemia was plausibly due to the tendency of having overcooked food destroying heat labile vitamins, lesser consumption of green vegetables, and increased predisposition to addiction/alcoholism.

Diabetics are more prone for anemia due to a chronic illness triggering renal compromise causing anemia of chronic disease. The existence of anemia with diabetics worsens the glomerular filtration rate (GFR) and leads to cardiovascular disease. Thus it is cardinal to diagnose and correct anemia in diabetics. An Iranian study on male diabetics showed 9.2%. [17] Another study on association of diabetics and renal function showed anemia in 19% diabetics. This emphasize on strict sugar control and correction of anemia as the anemia prevails the GFR declines causing a vicious circle [18] Sharif and Younus showed 27% of male diabetics are anemic [19] but our results show a much higher rate. The type of anemia in diabetics here was mainly normocytic. In 2015 Nadia and Shams showed 52% of diabetic males having anemia and 60% of them were normocytic [20].

It is a physiologically accepted fact that smokers have raised hemoglobin due to secondary polycythemia in response to erythropoietin. The elevation of erythropoietin is caused by hypoxia associated with the increase of carbon monoxide induced by smoking. An Iraqi study [21] comparing the hemoglobin status in smokers vs. nonsmokers found the hemoglobin levels are higher in smokers and suggested to adjust

hemoglobin values in smokers as smoking can mask anemia [22]. The high percentage of male smokers with anemia in our study was a surprise and an eye opener because it did not fit with the normal physiological response, implying that there are other overpowering mechanisms which are still causing anemia. Hence anemia in smokers is more sinister. This indirect relationship of anemia and smoking could be due to malignancy changes [23], recurrent chronic respiratory infections [24,25] and iron deficiency anemia because smoking hinders iron absorption [26]. This is understandable because the type of anemia was mainly normocytic and microcytic in smokers of our study.

5. CONCLUSION

Hence the study concluded that anemia is a prevailing substantial concern in healthy adult males of a developing country like Pakistan. This is an eye opener and an alarm for the doctors. A timely prompt identification and correction of anemia can help in diagnosis of underlying deficiencies or illness and also augment the recovery to improve the outcome in ongoing management of diseases. A better understanding and further research into the most common etiologies leading to anemia characterization would be an important step towards an effective strategy for dealing with anemia. The best approach to eradicate anemia would be an extensive structured community based stratagem by inculcating public awareness about benefits of balanced diet, mandatory inclusion of fresh green vegetables, meat and iron rich food into the diet and initiation of food fortified products like cereals with micronutrients. Availability and cognizance of routine medical/health checkups for screening and early diagnosis of chronic illness and mindfulness of drug abuse are other points for action. The results of the study can be utilized in a public health program to design targeted intervention aiming to reduce the burden of anemia in our region improving the well being of community along the way.

6. LIMITATIONS OF THE STUDY

It was a hospital based study on a considerably limited number of people in which CBC was done as a routine investigation. A wider scale study should be done on a community basis. We used data from patients coming to the hospital to assess the frequency of anemia in the population. This could have led to an overestimation of anemia. However, we excluded

patients admitted to the hospital. Limitations of our study also include an inability to know for certain whether patients had underlying hemoglobinopathy or X-linked G6PDH disorder which is known causes for anemia endemic in our region.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

The research protocol was approved by the relevant institution's review board and ethical committee.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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