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Prevalence of Anemia in Geriatric population: A one year hospital-based study.

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ABSTRACT
Background: Anemia is a condition with decrease in the red blood cell population or hemoglobin levels less than the lower limit for that particular age and sex. It is a common problem in all age groups, more commonly in children and childbearing age women. Less literature is present about anemia in the elderly population.
The objective of this study was to study the prevalence of anaemia in geriatric population and to study the morphological types of anaemia in geriatric age group.
Materials and Methods: A total of 579 cases were included from January 2021 to December 2021 out of which 238 were anaemic. Venous blood was collected. Wedge-Method of making peripheral smear was used. Leishman staining was done. Complete Blood Counts including indices were determined hematology analyzer.
Results: Majority of the patients belonged to age group 60-69 years followed by 70-79 years. Male predominance was observed amongst anemics. The prevalence of anemia was 41.11%. Hemoglobin(g/dL) in patients with anemia was >10 gm/dL and of moderate degree in majority of cases. Most frequent symptom was fatigue followed by headache and dyspnea. Palpitations were frequent in cases of mild anemia. The most common etiology was anemia of chronic disease, mostly chronic kidney disease followed by iron deficiency anemia. The most common morphological type of anemia was Normocytic Normochromic anemia and Normocytic Hypochromic anemia, followed by Microcytic Hypochromic anemia.
Conclusion: The prevalence of anaemia in geriatric population is high, which is frequently of mild to moderate severity. Screening, preferably with structured programmes addressing the geriatric population for associated Chronic diseases and nutritional deficiencies, in hospitals as well as the community is recommended so that corrective measures can be assured at an early stage and there can be decrease in the mortality and morbidity.
Keywords: anaemia, geriatric, prevalence, morphologic type of anaemia

I. INTRODUCTION:

Anemia is a phenomenon of decrease in the red blood cell population or hemoglobin of the body. It is a common problem in all age groups, more commonly in children and childbearing age women. Less literature is present about anemia in the elderly population[1-4]. The definition as per the United Nations defines an 'elderly' person as someone who is equal to 60 years or above 60.

Census report of 2011 denotes the elderly population to be 8.1 % in India and the expected rise in population of the elderly is estimated to be 19% in the year 2050, which is of great worry[5].

Decreased hemoglobin levels are seen to relate with underlying disease conditions and may help in diagnosis and early intervention[6].

Anemia in the elderly is an under-diagnosed sign and is not notified to the patient since it is taken to be a consequence of aging and it is sadly not taken to be a disease marker. Studies of recent nature have questioned this negligent approach because anemia in elderly is relevant and is a burden and a great deterrent to the healthcare system and the country's resources.

II. MATERIALSANDMETHODS:

The present study was conducted in the Department of Pathology, KAHER's JNMC, Belagavi from January 1st ,2021 to December 31st ,2021 (1 year duration).The study population were Patients above 60 years of age including clinically diagnosed cases of anaemia. After obtaining ethical clearance from the JNMC Institutional Ethics Committee on Humans Subjects Research, the participants were briefed about the study and informed consent was taken. A total of 579 cases

were included out of which 238 were anaemic. Venous blood was collected. Wedge-Method of making peripheral smear was used. Leishman staining was done. Complete Blood Counts including indices were determined using the 3-part differential analyzer of the brand 'Tulip Group', model 'CounCell-23 Plus', (based on principle of Electronic Impedance).

The data entry was done in the Microsoft EXCEL spreadsheet and the final analysis was done with the use of Statistical Package for Social Sciences (SPSS) software, IBM manufacturer, Chicago, USA, version 25.0.

For statistical significance, p value of less than 0.05 was considered statistically significant.

III. RESULTS:

In majority (172,72.27%) of patients with anemia, dietary habit was non-vegetarian.

Out of 579 patients, 238 were anemic. Thus, the **prevalence** of anemia is **41.11%**(Fig.1).

Nutritional deficiency anaemia was present in 122 cases (51.26%).

Hemoglobin(g/dL) in patients with anemia was >10 gm/dL in majority (152, 63.87%) of cases, followed by 7-10 gm/dL (77, 32.35%).

In majority (134, 56.30%) of patients, anaemia was moderate. Severe anemia was observed least frequently (16, 6.72%) (Fig. 2).

In majority (183,76.89%) of patients, most frequent symptom was fatigue followed by headache (84,35.29%), dyspnea (50, 21.01%), palpitations (29, 12.18%)) and vertigo (19,7.98%). The least frequent symptom was syncope (16,6.72%) (Fig. 3).

In majority (75, 31.51%) of patients, morphological type of anaemia was Normocytic Normochromic anaemia (NNA), Normocytic Hypochromic anaemia (NHA) each followed by Microcytic Hypochromic anaemia (MHA) (49, 20.59%) and Dimorphic anaemia (DA) (23, 9.66%). Morphological type of anaemia with least frequency was Macrocytic anemia (16, 6.72%) (Fig.4).

In majority (116, 48.74%)) of patients, etiology was anaemia of chronic disease followed by iron deficiency anemia (6, 26.89%), Vitamin B12 deficiency (34, 14.29%) and mixed (18, 7.56%). The least frequent etiology was folate deficiency. (6, 2.52%) (Fig 5).

In majority (35, 30.17%) of patients, the most frequent cause of anemia of chronic disease was chronic kidney disease (CKD) followed by cancer (28,24.14%), diabetes mellitus (16,13.79%).

With increase in age (>=80 years), Microcytic Hypochromic anemia and Macrocytic anemia were more frequently observed which was statistically significant(p value:0.014).

Mild, moderate and severe anemia were most frequently seen in Normocytic Normochromic anemia, Microcytic Hypochromic anemia and Dimorphic anemia respectively. The association of morphological type of anemia with severity of anemia was statistically significant. (p value:0.0004)

Anemia of chronic disease was found to be frequently associated with Normocytic Normochromic Anemia, folate deficiency with Dimorphic anemia, Iron deficiency anemia with Microcytic anemia, Vitamin B12 deficiency with macrocytic anemia and Mixed anemia with Dimorphic anemia. The association between etiology and morphology was found to be statistically significant. (p value:<0.0001)

There was no statistically significant association between etiology and severity of anemia and hemoglobin levels; between age group and severity of anemia.

Anemics were more frequent in >= 80 years with mild anemia being common in males, moderate and severe anemia in females.

Normocytic Normochromic anemia, Normocytic hypochromic anemia and Macrocytic anemia were seen more frequently in females. Microcytic Hypochromic anemia and Dimorphic anemia were seen more frequently in males. However, the association of Morphological type of anemia with gender was statistically insignificant.

IV. DISCUSSION:

The frequency of Study subjects and Prevalence were compared with various studies. The study subjects in the Present Study were comparable with a study done by Soni et al [7] , Argento et al[8] and Dobariya et al.[9]. Many of the studies had a lower sample size. Timiras et al.[10] and Denny et al.[2] had a higher sample size.

The highest prevalence was observed in studies done by Chamba et al.[1] and Alsaeed et al.[11] which had a prevalence of 79 % and 71.6%, respectively. The high prevalence in these studies may be due to higher rates of communicable diseases and the lower socioeconomic status present in developing countries. (Table. 1)

The Mean age of the present study (67.89) is in concordance with studies done by Munesh et al.[12] and Bhasin et al.[13]

The Present Study had the most frequent age group as 60-69, which was in league with Munesh et al. [12], Chamba et al. [1] and Tettamanti et al.[14]. This may be due to the fact that there is more population in the age group 60-69 and 70-79 as

compared to >=80 years of age. The same explains the mean age in various studies which are less than 80 years of age (Table.2).

In the present study, Males were more than females which was comparable with various studies done by Munesh et al. [12], Chamba et al.[1]and Brenda et al. [15]

Distribution of Nutritional deficiency anaemia was comparable with the study done by Munesh et al. [12] It was slightly less in the study done by Argento et al. [8] Study done by Chamba et al.[1] showed a significantly lower frequency of nutritional anaemia which may be in concordance with the region, Tanzania, which has a high burden of communicable diseases and low socioeconomic statuses and lower hospital admissions.

The Present study had Anaemia of Chronic Disease as the most frequent aetiological factor for anaemia followed by Iron deficiency anaemia, which was comparable with studies done by
Petrosyan et al. [16] and Dobariya et al.[9] In our present study, Iron deficiency was the second mostfrequent aetiological factor. Iron deficiency anaemia followed by Anaemia of chronic disease was seen in studies done by Sharma et al.[17], Bhasin et al.[13] and Munesh et al.[12] The frequency of Anemia of Chronic disease and Iron deficiency were comparable in all the studies. (Table. 3)

The severity of anemia in our study was moderate anaemia in majority of the cases, which was comparable with Joosten et al. [18] and Dobariya et al. [9] Severe anaemia was seen to be more in the >=80 years age group in the above listed studies. This age-group had a lower frequency of participants. 60-69- and 70-79-years age group had more participants and mild and moderate anaemia was more prevalent in these groups. This may be the reason for higher frequency of less severe anaemia. (Table.4)

The present study had a mean haemoglobin value which was comparable to studies done by Munesh et al. [12] and Singhal et al. [19]

The mean of RBC parameters of the present study is in concordance with studies done by Munesh et al. [12], Styszynski et al. [20] and Bhasin et al.[10] The mean RBC parameters (MCV, MCH, MCHC, RDW) were within normal range except RDW in the study done by Munesh et al.[12] which shows a slight increase which may be due to a greater number of Iron Deficiency Anaemia cases.

The most frequent morphological type of anaemia, Normocytic Normochromic and Normocytic Hypochromic anaemia, in the present study was comparable with the morphologies found in studies done by Styszynski et al. [20], Dobariya et al.[9], Izaks et al.[6] (Table.5)., Bhasin et al.[13] and Argento et al.[8] Munesh et al.[12] showed higher frequency of microcytic Anaemia. In the above studies, except Munesh et al.[12], Anemia of chronic disease was most frequent aetiology of anaemia followed by Iron deficiency anemia. Iron deficiency was most frequent etiology in the study done by Munesh et al.[12]

V. CONCLUSION:

The prevalence of anaemia in geriatric population is high, which is frequently of mild to moderate severity. This may be attributed to the fact that India is a third world country and has lower socio-economic conditions, higher nutritional deficits and a greater number of communicable diseases which lead to higher rates of hospitalization in the elderly.

Cases with fatigue and palpitations in geriatric population have to be screened for anaemia. Non-specific symptoms like weakness, fatigue and malaise are common and can be attributed to the aging process instead of anaemia. Such patients have to be screened for anaemia.

Anaemia of chronic disease, which had Normocytic Normochromic anaemia frequently and Iron deficiency anaemia, which had Microcytic Hypochromic anaemia most frequently were the most common aetiologies associated with anaemia in geriatric age group with increasing age. Hence, screening preferably with structured programmes addressing the geriatric population for associated Chronic diseases and nutritional deficiencies, in hospitals as well as the community is recommended, so that corrective measures can be assured at an early stage and there can be decrease in the mortality and morbidity.

Limitation:

This is a hospital-based study. More community-based studies have to be undertaken to know theexact prevalence rates and the real burden of the disease in the country and the world.

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Authors' contribution:
Both authors contributed to the idea of the study, contributed to the design of the study, data collection, interpretation of the result, drafting of the manuscript, reviewing and editing the manuscript and approved the final version of the manuscript.

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Conflict of Interest: The authors declare that there are no conflicts of interests.

Data and materials availability: All data associated with this study are present in the paper.

Ethical clearance: MDC/DOME/125/2020 (JNMC Institutional Ethical Committee on Human Subjects Research, J.N Medical College, Belagavi.

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TABLES AND FIGURES:

Table 1. Number of study subjects and prevalence in different studies.

Study	**Study Subjects**	**Prevalence**
Chamba et al.[1]	156	79.5%
Haslam et al.[21]	185	26.2%
Dobariya et al.[9]	500	51.1%
Pathania et al.[22]	334	68.7 %
Melku et al.[23]	200	54.5%
Timiras et al.[10]	1024	12.01%
Denny et al. [2]	1744	24%
Argento et al.[8]	244	39.6%
Alsaeed et al.[11]	150	71.6%
Sahin et al.[24]	257	54.9%
Soni et al.[7]	550	67.07%
Present study	**579**	**41.11%**

Table 2. Comparison of age distribution and the most frequent age group.

Study	**Mean age (in years)**
Penninx et al. [25]	74.3
Lucca et al.[26]	74.4
Bhasin et al. [13]	70.51
Styszynski et al.[20]	78.6
Munesh et al. [5]	68.43
Present Study	**67.89**

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Study	Age Group
Munesh et al.[12]	60-69
Chamba et al.[1]	60-69
Tettamanti et al.[14]	60-69
Present Study	**60-69**

Table 3. Comparison of Most frequent aetiology

Study	Frequent Aetiology
Munesh et al. [12]	Iron Deficiency Anaemia
Petrosyan et al. [16]	Anaemia of Chronic Disease
Sharma et al. [17]	Iron Deficiency Anaemia
Bhasin et al. [13]	Iron Deficiency Anaemia
Dobariya et al. [9]	Anaemia of Chronic Disease
Present Study	**Anaemia of Chronic Disease**

Table 4. Comparison of most frequent type of severity of anemia

Study	Haemoglobin levels
Argento et al.[8]	Mild
Dobariya et al.[9]	Moderate
Gandhi et al.[27]	Mild
Joosten et al. [18]	Moderate
Present study	**Moderate**

Table 5. Comparison of the most frequent Morphological type of anaemia.

Study	Morphology
Munesh et al. [12]	Microcytic Hypochromic
Styszynski et al.[20]	Normocytic Normochromic
Dobariya et al.[9]	Normocytic Normochromic
Izaks et al.[6]	Normocytic Normochromic
Bhasin et al. [13]	Normocytic Normochromic
Argento et al.[8]	Normocytic Normochromic
Present study	**Normocytic Normochromic and Normocytic Hypochromic**

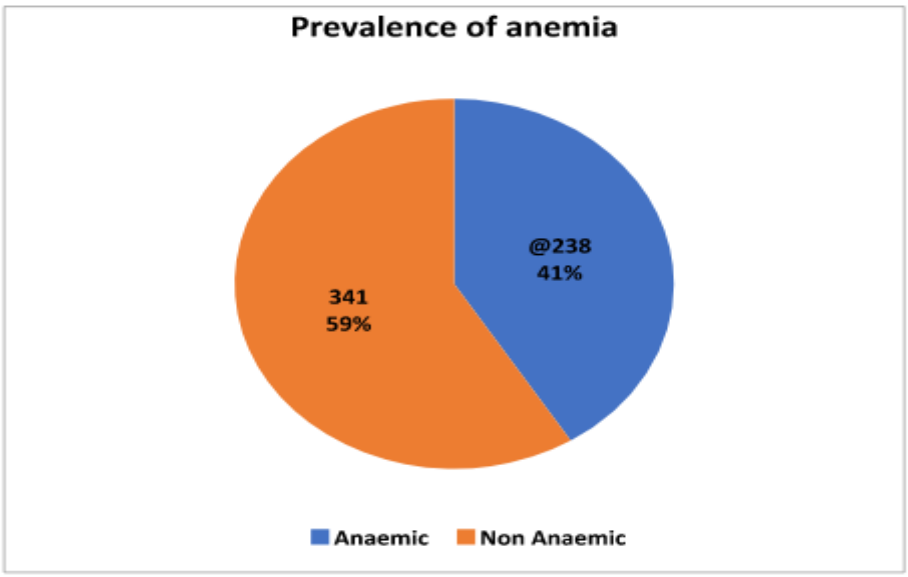

Fig 1: Distribution of Anemic/ Non-anemic study subjects

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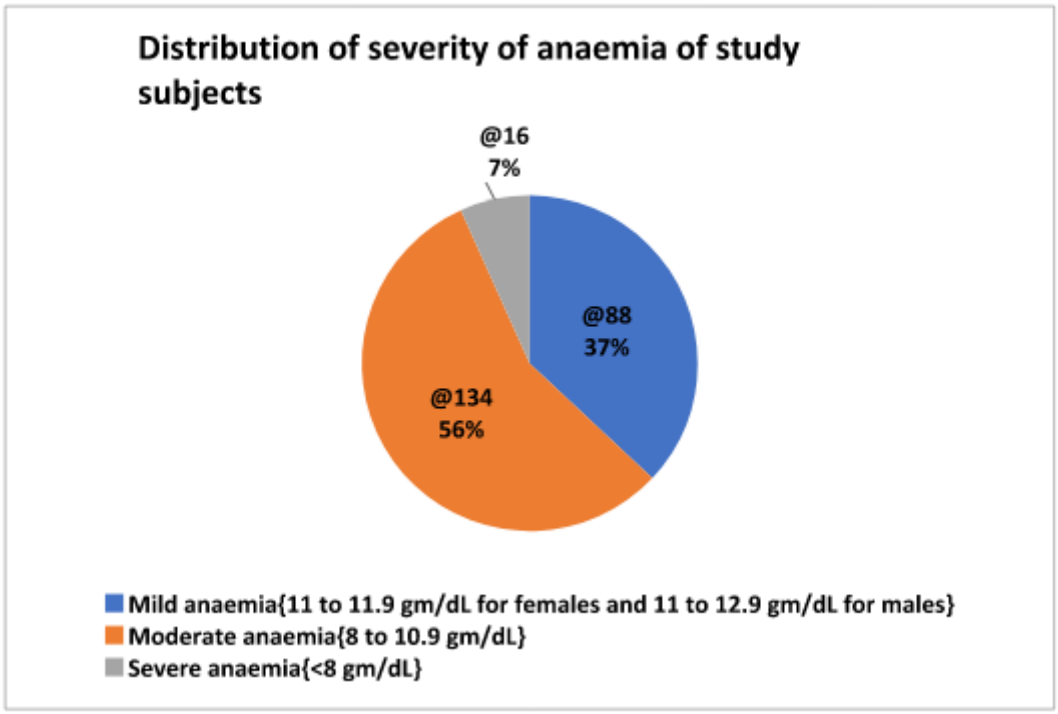

Fig 2: Distribution of severity of anemia

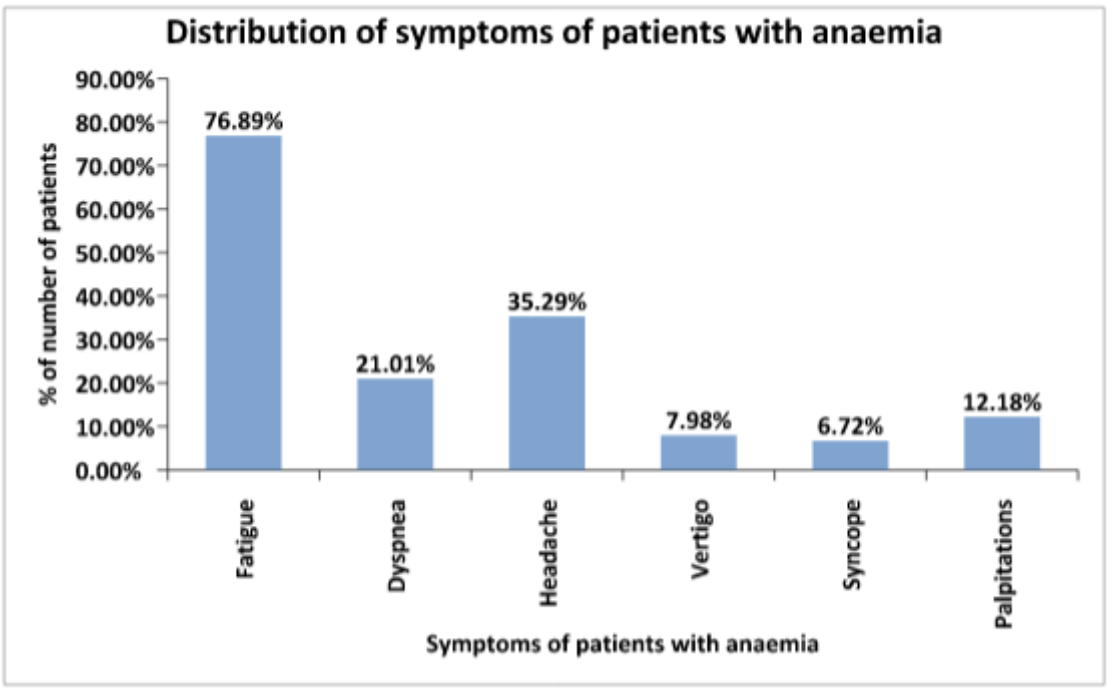

Fig 3: Distribution of symptoms

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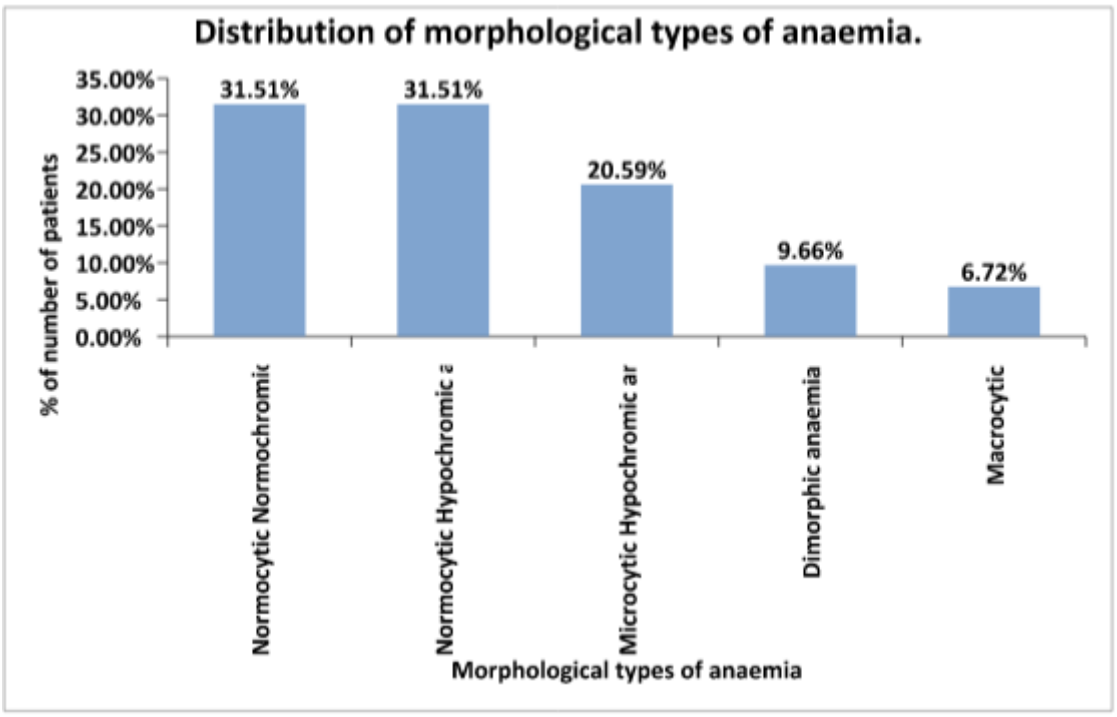

Fig 4: Distribution of morphological types of anemia

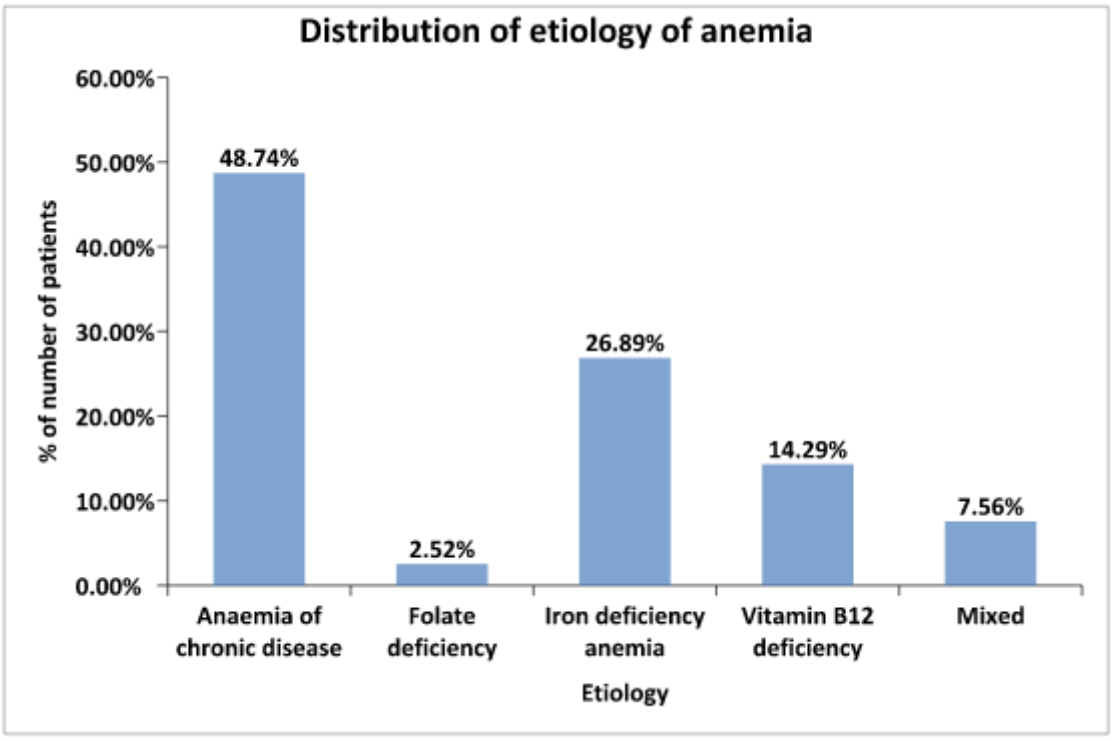

Fig 5: Distribution of etiology of anemia