

**ANAEMIA OF CHRONIC DISEASE (ACD); A CROSS SECTIONAL STUDY IN THE
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ABSTRACT

Anemia of chronic disease, also known as anemia of inflammation, is the term used to describe the hypoproliferative anaemia. Occurs mainly in hospitalized patients, is the second most common form of anemia following iron deficiency anemia. The basic aim of our study is to enhance the patient knowledge regarding Anemia of chronic disease. **Objective:** To describe anemia in various chronic disease conditions and to assess the treatment pattern also to assess the grades of anemia of chronic disease based on World Health organization scale. **Methods and Methodology:** Cross sectional study on 150 cases of Anaemia of chronic disease were enrolled from the Department of General Medicine, MIMS Mandya from July 2022 to December 2022. **Results:** Among 150 patients, majority of the chronic diseases with anaemia were under heart related chronic diseases (28.42%). Most of the patients were with moderate anaemia 57 (38%). Ferrous sulphate Folic acid (24.79%) was most commonly prescribed. **Conclusion:** Anaemia is present as comorbidity in chronic disease patients and is associated with poor quality of life and increased morbidity. Identification and correction of anemia of chronic disease based on treating the underlying cause may improve their clinical outcome.

KEYWORDS: Anaemia of Chronic Disease, comorbidity, chronic disease.**INTRODUCTION**

Anaemia, according to the World Health Organization (WHO) criteria, is defined as a haemoglobin concentration less than 13g/dL for men or less than 12g/dL for women.^[1] Globally, the prevalence of anemia in those aged 60 years and above is 39%. In Asia, it is 54.1%. The causes of anemia can be multifactorial. However, chronic disease and iron-deficiency anemia are the most common causes of anemia in older people.^[2]

Anaemia of Chronic Disease is the most commonly encountered anaemia in hospitals, after iron deficiency anaemia.^[3] The incidence of ACD increases with age, affecting 77% of the elderly with no specific etiology for their anemia.^[4] As its name implies it is caused by chronic diseases such as Infections (acute and chronic) (viral infections, including HIV infection, bacterial, parasitic, fungal) 18–95%, Cancer (hematological, solid tumour) 30–77%, Auto-immune (rheumatoid arthritis, systemic lupus erythematosus and connective-tissue diseases, vasculitis, sarcoidosis, inflammatory bowel disease) 8–71%, Chronic rejection after solid-organ

transplantation 8–70% CKD and inflammation 25 – 30%.^[5]

METHODOLOGY

A cross-sectional study on anaemia of chronic disease was conducted in tertiary care hospital MIMS, Mandya. The study was carried out for a period of 6 Months in the General medicine department. A total 150 patients were selected according to the study criteria. The subjects included in this study were both male and female patients who are admitted with chronic disease condition and Patients undergoing blood transfusion. Patients recently undergone surgery and Patients undergone dialysis were excluded from the study.

RESULTS

This study was conducted in general medicine department of MIMS, Mandya. A total of 150 patients admitted in MIMS were enrolled in the study based on study criteria. The required details from the patient case sheet were recorded in a suitably designed patient profile form. The prescription data of 150 patients were analysed in the current study.

Patients demographic characteristics

Table 1: Patients Demographics Characteristics.

Characteristics	No Of Patients
Age (Mean±SD)	53.9±15.27
Gender	
Male	57
Female	93
Social History	
Smokers	42
Chronic smoker	11
Occasional Smoker	31
Alcoholic	45
Chronic Alcoholic	13
Occasional Alcoholic	32
Chronic Diseases	
Heart diseases	75
Lung diseases	53
Metabolic disorders	52
Neurological diseases	25
Renal diseases	20
Liver diseases	17
Other infectious diseases	15
Skin diseases	7

Distribution of patient based on gender

A total of 150 patient’s data was collected from MIMS hospital during a period of six months. Among the whole 150, 57 (38%) were males and 93 (62%) were females. This study shows that females are more prone to serious medical illness.

Table 2: Distribution of patient based on gender.

Gender	Number of Patients	Percentage
Male	57	38%
Female	93	62%
Total	150	100%

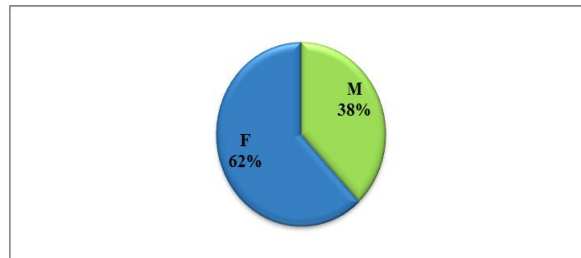


Fig 1: Distribution of patients based on gender.

Distribution of patient Based on Age group

Among the 150 patients involved in the study, the maximum number of patients was found in the age group of 57-66 (36%) and the minimum number of patients were found in the age group of 87-96 years (1.33%).

Table 3: Distribution of patient based on age group.

Age	Male	Female	Total	Percentage
17-26	1	3	4	2.66%
27-36	11	11	22	14.66%
37-46	11	11	22	14.66%
47-56	9	14	23	15.33%
57-66	19	35	54	36.00%
67-76	5	11	16	10.66%
77-86	1	6	7	4.66%
87-96	0	2	2	1.33%

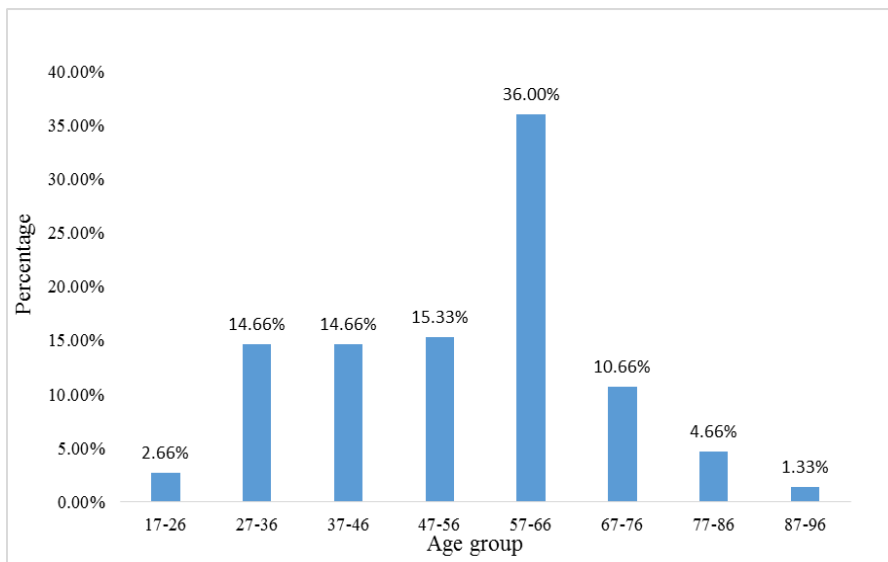


Fig. 2: Distribution of patient based on age group.

Distribution of patients based on chronic disease condition

A total of 41 types of chronic diseases were diagnosed and the chronic diseases are categorized into heart diseases, lung diseases, liver diseases, renal diseases,

neurological diseases, metabolic disorders, skin diseases and other infections.

Maximum number of Anaemic patients are found under Heart related chronic diseases (28.42%) followed by

lung diseases (20.09%) and metabolic disorders (19.70%). And least number of patients found under skin diseases (1.33%).

Table 4(a): Distribution patients based on chronic diseases.

Chronic Diseases	Number	Percentage
Heart diseases	75	28.42%
Lung diseases	53	20.09%
Metabolic disorders	52	19.70%
Neurological diseases	25	9.47%
Renal diseases	20	7.58%
Liver diseases	17	6.44%
Other infectious diseases	15	5.69%
Skin diseases	7	2.66%

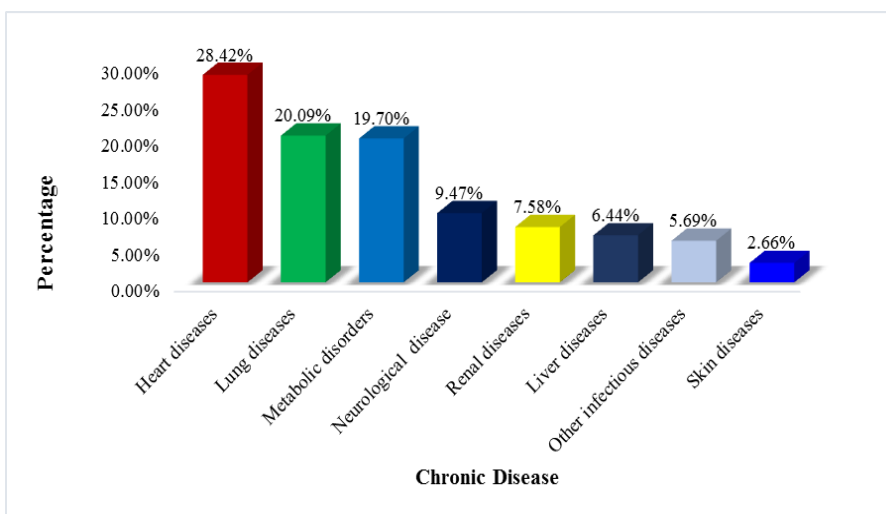


Fig. 3: Distribution patients based on chronic disease.

Table 4(b): Distribution patients based on chronic diseases.

Chronic diseases		Frequency	Percentage
Heart	Ischemic heart disease	14	5.30%
	Congestive cardiac failure	9	3.41%
	Left ventricular dysfunction	3	1.14%
	ACS NSTEMI	4	1.52%
	Hypertension	41	15.53%
	Hypotension	4	1.52%
Neurological	Cerebrovascular Accident (stroke)	14	5.30%
	Seizure	5	1.89%
	Epilepsy	1	0.38%
	Schizophrenia	1	0.38%
	Psychosis	2	0.76%
	Alcohol Dependence Syndrome	1	0.38%
	Cervical compressive myelopathy	1	0.38%
Liver	Alcoholic Liver Disease	7	2.65%
	Chronic Liver Disease	8	3.03%
	Hepatitis	2	0.76%
Lungs	COPD	13	4.92%
	Pneumonia	19	7.20%
	Asthma	4	1.52%
	Tuberculosis	9	3.41%
	Respiratory failure	2	0.76%
	Cor pulmonale	3	1.14%
	Pulmonary Embolism	1	0.38%

Kidney	Bronchiectasis	1	0.38%
	Bronchitis	1	0.38%
	Chronic Kidney Disease	16	6.06%
	Pyelonephritis	3	1.14%
	Nephropathy	1	0.38%
Skin	Psoriasis	1	0.38%
	Herpes Zoaster Infection	1	0.38%
	Leprosy	1	0.38%
	Pemphigus Vulgaris	1	0.38%
	Cellulitis	3	1.14%
Metabolic Disorder	Diabetes Mellitus	40	15.15%
	Diabetic ketoacidosis	4	1.52%
	Hypothyroidism	8	3.03%
Other Infection	Urinary Tract Infection	8	3.03%
	Retroviral Disease(HIV)	3	1.14%
	Pancreatitis	2	0.76%
	Polymyositis	1	0.38%
	Malaria	1	0.38%

Distribution of Patient Based on Social history

In this study, among 150 patients, 32 (14.67%) of patients were occasional alcoholic, 12 (16.0%) of patients were chronic alcoholic and 105 (69.33%) of patients were non-alcoholic and 31 (7.33%) were occasional smokers, 11 (20.67%) were chronic smokers, 108 (72.0%) were non-smokers.

Table 5: Distribution based on social history.

Nature	Alcohol		Smoking	
Occasional	32	14.67%	31	7.33%
Chronic	12	16.00%	11	20.67%
None	105	69.33%	108	72.00%

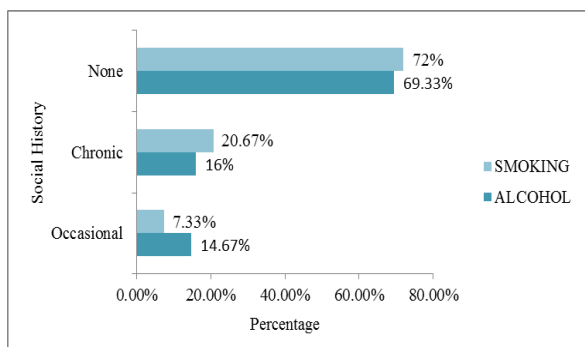


Fig. 4: Distribution of patient based on social history.

Distribution of patient based on Anaemia grade

Haemoglobin was assessed from complete blood count report. Out of 150 patients, Mild anaemia (Hb10-11.9gm/dl) was present in 54 (36.00%) patients, Moderate anaemia (Hb 7.9-9.9gm/dl) was present in

57(38.00%) patients and Severe anaemia (Hb below7gm/dl) was present in 39(26.00%) patients.

Table 6: Distribution of patient based on WHO grade.

Grades of anaemia	Number of patients	Percentage
Mild	54	36.00%
Moderate	57	38.00%
Severe	39	26.00%

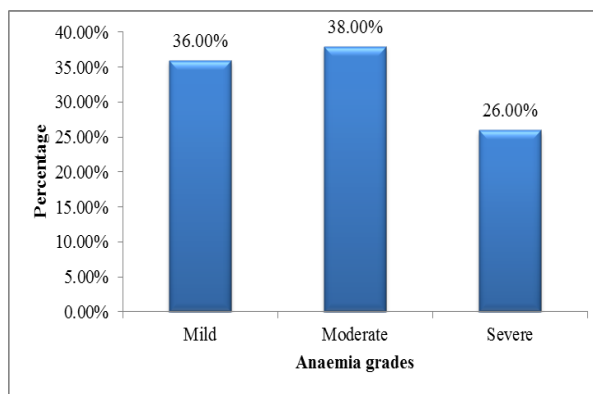


Fig. 5: Distribution of patient based on who grade.

Distribution patients based on RBC Morphology

In this study, among 150 patients Red blood morphology was Microcytic hypochromic anaemia in 63(76.83%) patients, Normocytic normochromic anaemia in 17(20.73%) patients and Macrocytic normochromic anaemia in 2(2.44%) patients.

Table 7: Distribution of patients based on RBC Morphology.

RBC Morphology	Number of patients	Percentage
Microcytic hypochromic anaemia	63	76.83%
Normocytic normochromic anaemia	17	20.73%
Macrocytic normochromic anaemia	2	2.44%

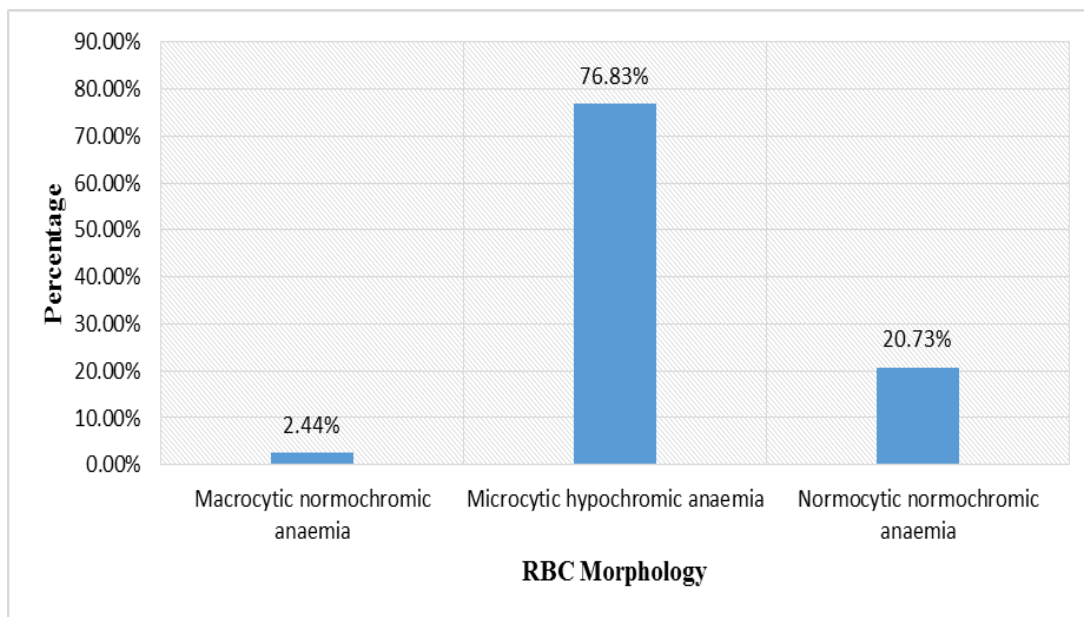


Fig 6: Distribution of patient's based on RBC Morphology.

Distribution of patients based on presenting complaints

In this study, among 150 patients Fever was the commonest presenting complaint 45(25.00%) followed by breathlessness 42(23.33%), fatiguability 35(19.44%), vomiting 32(17.78%), chestpain 13(7.22%), giddiness 9(5.00%) and headache 4(2.22%).

Table 8: Distribution of patients based on presenting complaints.

Presenting complaints	No of patients	Percentage
Fever	45	25.00%
Fatiguability	35	19.44%
Giddiness	9	5.00%
Vomiting	32	17.78%
Headache	4	2.22%
Breathlessness	42	23.33%
Chest pain	13	7.22%

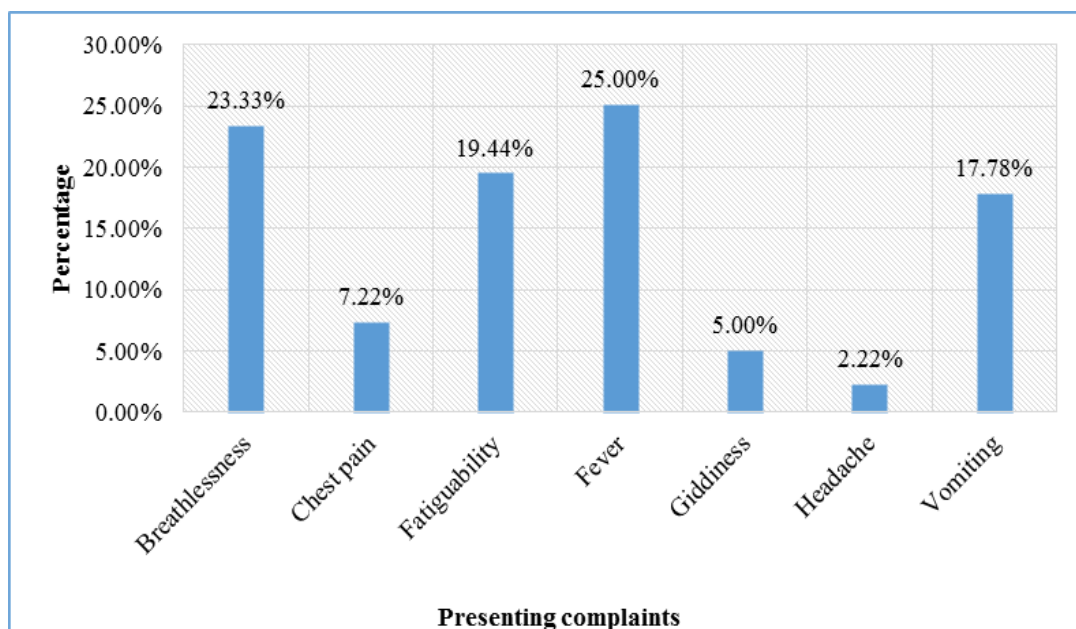


Fig. 7: Distribution of patients based on Presenting complaints.

Distribution of patients based on physical examination

On physical examination among 150 patients, 40 (47.00%) patients were pallor, 16(18.82%) patients had

edema, 13(15.29%) had splenomegaly, 4 (4.71%) had both clubbing and cyanosis, 3 (3.53%) had both hepatomegaly and icterus, 2 (2.35%) had lymphadenopathy.

Table 9: Distribution of patients based on physical examination.

Physical examination	Number of patients	Percentage
Pallor	40	47.00%
Splenomegaly	13	15.29%
Hepatomegaly	3	3.53%
Lymphadenopathy	2	2.35%
Edema	16	18.82%
Clubbing	4	4.71%
Cyanosis	4	4.71%
Icterus	4	4.71%
Icterus	3	3.53%

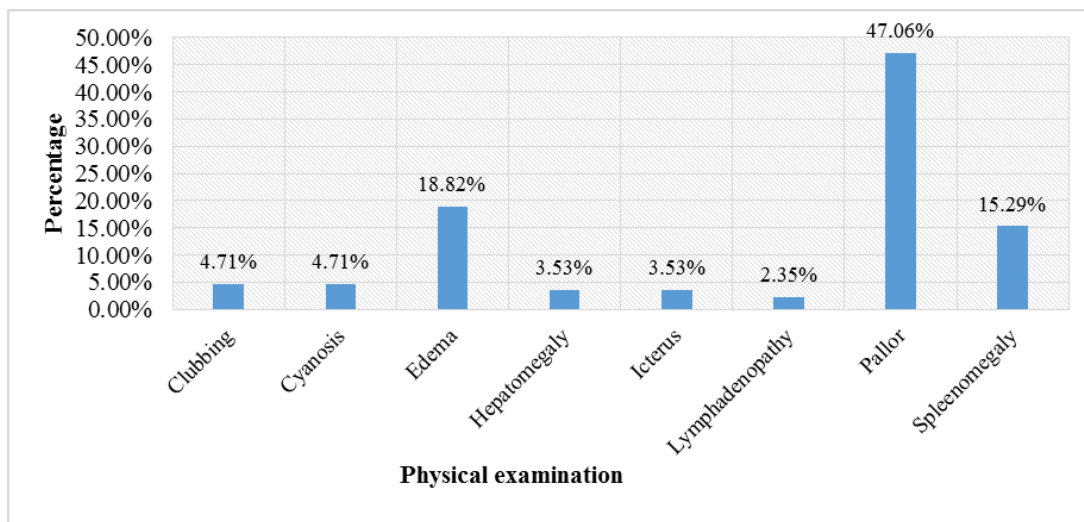


Fig. 8: Distribution of patients based on physical examination.

Distribution of patients based on Blood transfusion given

In this study among 150 patients, 33 (22%) patients were given with blood transfusion and 117 (78%) patients were not given blood transfusion.

Table 10: Distribution of patients based on blood transfusion given.

Blood transfusion	Number of patients	Percentage
Given	33	22.00%
Not given	117	78.00%

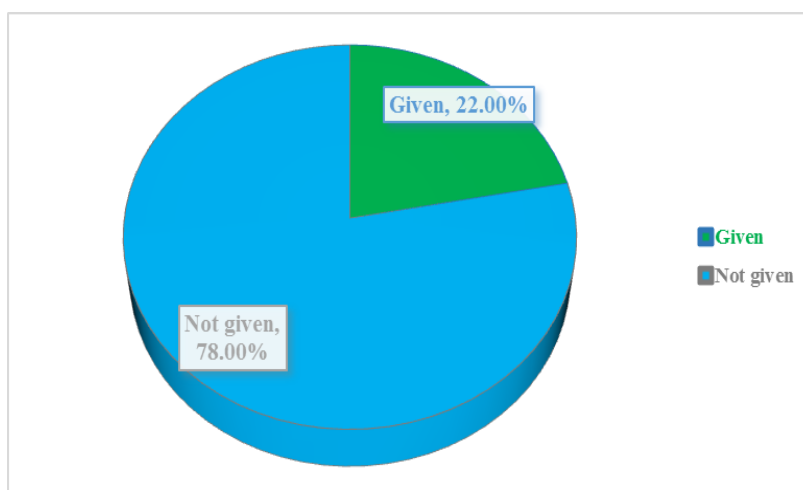


Fig 9: Distribution of patients based on blood transfusion given.

Distribution of patients based on treatment pattern

In this study among 150 patients, Treatment are classified into Oral route, parenteral route and blood

transfusion. Ferrous sulphate folic acid is most commonly prescribed drug. Followed by Vitamin B complex and blood transfusion.

Table 11: Distribution of patients based on treatment pattern.

Route of administration	Treatment	Number	Percentage
1. Oral route	Ferrous sulphate folic acid	58	24.79%
	Vitamin B complex	52	22.22%
	Thiamine	3	1.28%
	Albendazole	10	4.27%
2. Parenteral route	Iron sucrose	26	11.11%
	Multivitamin	8	3.42%
	IVF(NS,RL)	29	12.39%
	Vitcofol	15	6.49%
3.Blood transfusion	Packed red blood cells(PRBC)	33	14.10%

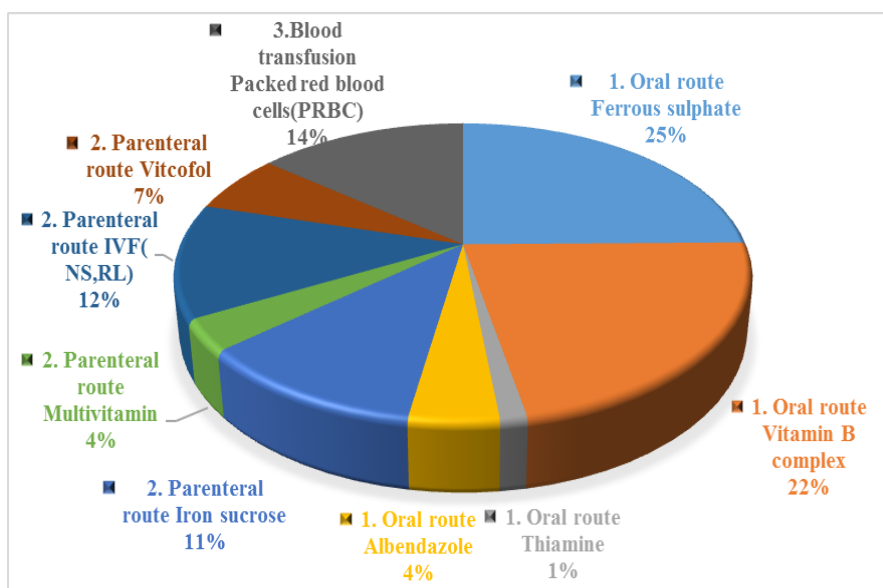


Fig. 10: Distribution of patients based on treatment pattern.

DISCUSSION

The global health problem of anemia continues to be widespread and significant. This study demonstrated that the prevalence of anaemia was relatively high among chronic disease patients. After controlling for the confounding factors, we found that the prevalence of anaemia varied with age group, smoking status, drinking habit, obesity and some non-communicable diseases. In people more than 55 years of age, the prevalence of anaemia increases by 2–3 fold (37.6%), suggesting the need for routine screening for anaemia. Considering the prevalence of anemia increases with age, it is crucial to understand the association between anemia and chronic disease. Our findings confirm that Anaemia is prevalent among female patients. And most of the patients were with Moderate grade of anemia (38%). Fever was the commonest presenting complaint and pallor was the commonest physical examination finding. ACD is normocytic normochromic type of anaemia but longstanding disease can change its morphology to microcytic hypochromic type. Our results showed that 76.83% cases had microcytic hypochromic blood picture. All these results are in accordance with study conducted by **Muhammad Maaz *et al.***^[3]

A higher prevalence of co-morbidities, such as hypertension, diabetes and chronic kidney disease, accounts for the higher prevalence of anemia among older people. We found that older people with heart related chronic diseases had higher rates of anaemia (28.42%). Prevalence rate of anaemia among hypertension and diabetes was found to be 15.53% and 15.15% respectively. But according to the study of **Yusof *et al.***^[6] Chronic disease profiling showed that the prevalence rates of anemia in the older persons with diabetes, hypertension and hypercholesterolemia were 38.6%, 35.3% and 34.1%, respectively. Evidence indicates that the incidence and prevalence of anaemia in patients with diabetes is associated with erythropoietin deficiency caused by diabetic kidney damage. The older persons with diabetes were more likely to have anemia due to the increased risk of chronic kidney disease.

We found that patients with heart related chronic diseases had higher rates of anaemia (28.42%). Anemia is related to an adverse outcome of patients with cardiovascular disease. Our data further indicate that inflammation is the underlying cause for the development of anemia in a high percentage of patients with Coronary Artery Disease. Therefore patients with ACD also had a poorer prognosis than subjects with

multifactorial anemia. This is in accordance with the study conducted by **Lukas Lanser *et al.***^[7] Both the study have similar results.

This study had some limitations. First, it was a cross-sectional study and could only infer correlation, not causation. Second, randomised sampling would represent the best design for testing the prevalence of anaemia and its associated factors among older adults. However, large random sampling was not practically feasible and we therefore adopted a convenient sampling method to recruit participants. This was a major factor preventing the extrapolation of the results to the general population. However, these limitations do not affect the significance of the results, which provide the evidence of the prevalence and risk factors of anaemia among chronic disease patients.

CONCLUSION

The major goal of our study was to alert clinicians to consider anaemia in association with chronic diseases. Anaemia negatively influences patient's wellbeing, physical activity, Morbidity and might also aggravate the severity of symptoms of the underlying diseases.

According to our study majority of patients were female compared to male. Most of the patients were treated with ferrous sulphate folic acid and most common chronic disease associated with anaemia was hypertension followed by diabetes mellitus.

The implementation of preventive programs with a focus on improving access to iron supplements, early diagnosis and treatment should be taken into consideration. For this screening of the high risk population is necessary.

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