Prevalence Of Anemia- Age And Gender Wise

Dr. Devyani Sharma[1], Dr. Pragya Yadav[2], Dr. Adreena Mittal[3], Dr. Prem Kumar Garg[4], Dr. Parul Singhal[5]

1 Junior Resident,2 Junior Resident,3 Associate professor,4 HOD & Professor,5 Professor.
Saraswathi Institute Of Medical Sciences, Hapur

Abstract:
Introduction- *Anemia is considered as one of the major health problem in India. Childhood and adulthood represent a sensitive period for developmental changes therefore anemia in this formative phase of life can impair neurocognitive and pubertal development reduce work capacity and increase susceptibility to infections.*
Aim *– to describe the prevalence of anemia among patients on the basis of their age and gender from all department of Saraswathi institute of medical sciences, Hapur, Uttar Pradesh, India.*
Material & methods- *a study was performed on patients admitted from January 1ˢᵗ 2022 to May 30 2022 using hospital database.*
Results *– anemia is divided into 3 categories based on the values of haemoglobin . It showed variation with age , maximum number of patients having mild anemia was found in age group 50-60 years, where else moderate anemia in 40-50 years and severe anemia in 20-30 years respectively. Females and males have similar hemoglobin concentration until the onset of puberty. The statistics proved females are more prone to anemia as compared to males.*
Keywords : *Anemia, Age, Gender.*

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I.   Introduction

The total number of people suffering from anemia in the world is two billion and out of them around half of the population is suffering from iron deficiency according to the world health organization (who)[1]**.** Since anemia is considered as a late indicator of iron deficiency, therefore, it is estimated that the prevalence of iron deficiency is 2.5 times that of anemia [1, 2]. Since the period between childhood and adulthood represent a sensitive period for developmental changes, therefore, anemia in this phase of life can impair neurocognitive and pubertal development[3]**.** Nutritional and non-nutritional causes of anemia includes micronutrient deficiencies and genetic blood disorders, inflammation, infectious diseases and other physiological conditions such as menstruation and pregnancy [4]**.**The prevalence of anemia as per the national family health survey 5 (2019-21), is 25.0 percent in men (15-49 years) and 57.0 percent in women (15-49 years). 31.1 percent in adolescent boys (15-19 yrs), 59.1 percent in adolescent girls,52.2 percent in pregnant women (15-49 years) and 67.1percent in children (6-59 months)[5].

The aim of this study is to describe the prevalence of anemia among IPD patients on basis of their age and gender from all department of Saraswathi institute of medical sciences, Hapur, Uttar Pradesh, India.

II.   Material And Methods

Source of data: the study done in Saraswathi institute of medical science, Hapur, Uttar Pradesh.

Number of sample: 1500

Study period: January2022 to May 2022.

Study design: We collected laboratory data(hemoglobin, age and gender) from the hospital database of patients who had been admitted from Jan1 2022, to May 30, 2022. We used anemia grading according to recommendation from the who as; mild anemia: Hb: 10-12gm/dl, moderate: hb:8-10gm/dl, severe: <8gm/dl. We stratified the data according to severity of anemia, age and gender.

Inclusion criteria: IPD patient with hemoglobin <12

Exclusion criteria: none.

III. Review Of Literature

De lm et al reported that in anemia there is reduction in the number of red blood cells and/or hemoglobin (hb) concentration[6]. In men, normal range of hemoglobin levels is 13.5 to 18.0 g/dl , in women: 12.0 to 15.0 g/dl and in children : 11.0 to 16.0 g/dl.

Table 1: Haematological Value For Normal Infants(7)

	Birth	Day 3	Day 7	Day 14	1 Month	2 Months	3-6 Months
Red blood cell count (RBC) × 10^{12}/l	6.0 ± 1.0	5.3 ± 1.3	5.1±1.2	4.9±1.3	4.2 ± 1.2	3.7 ± 0.6	4.7 ± 0.6
Haemoglobin g/l	180 ± 40	80 ± 30	175±4	165±4	140 ± 25	112 ± 18	126 ± 15
Packed cell volume (PCV) l/l	0.60 ± 0.15	0.56 ± 0.11	0.54 ± 0.12	0.51 ± 0.2	0.43 ± 0.10	0.35 ± 0.07	0.35 ± 0.05
Mean cell volume (MCV) fl	110 ± 10	105 ± 13	107 ± 19	105 ± 19	104 ± 12	95 ± 8	76 ± 8
Mean cell Hb (MCH) pg	34 ± 3	34 ± 3	34 ± 3	34 ± 3	33 ± 3	30 ± 3	27 ± 3
Mean cell Hb conc (MCHC) g/l	330 ± 30	330 ± 40	330 ± 50	330 ± 50	330 ± 40	320 ± 35	330 ± 30
Reticulocytes × 10^9/l	120-400	50-350	50-100	50-100	20-60	30-50	40-100
White blood cell count (WBC) × 10^9/l	18 ± 8	15 ± 8	14 ± 8	14 ± 8	12 ± 7	10 ± 5	12 ± 6
Neutrophils × 10^9/l	4-14	3-5	3-6	3-7	3-9	1-5	1-6
Lymphocytes × 10^9/l	3-8	2-8	3-9	3-9	3-16	4-10	4-12
Monocytes × 10^9/l	0.5-2.0	0.5-1.0	0.1-1.7	0.1-1.7	0.3-1.0	0.4-1.2	0.2-1.2
Eosinophils × 10^9/l	0.1-1.0	0.1-2.0	0.1-0.8	0.1-0.9	0.2-1.0	0.1-1.0	0.1-1.0
Lymphocyte subsets (× 10^9/l)**							
CD3		3.1-5.6				2.4-6.5	2.0-5.3
CD4		2.2-4.3				1.4-5.6	1.5-3.2
CD8		0.9-1.8				0.7-2.5	0.5-1.6
CD4/CD8 ratio		1.1-4.5				1.1-4.4	1.1-4.2
Platelets × 10^9/l	100-450	210-500	160-500	170-500	200-500	210-650	200-550

*There have been some reports of WBC and platelet counts being lower in venous blood than in capillary blood samples, although still within these reference ranges. In one study venous blood from a newborn gave lower values for haemoglobin, RBC, and WBC than capillary blood but gave higher values for platelets and lymphocytes.[60]

**Approximations because wide variations have been reported in different studies.

Table 2: Haematological Value For Normal Children(7)

Red cell count × 10⁻⁹/l	4.5 ± 0.6	4.6 ± 0.6	4.6 ± 0.6
Haemoglobin g/l	126 ± 15	125 ± 15	135 ± 20
Packed cell volume (PCV) l/l	0.34 ± 0.04	0.37 ± 0.03	0.40 ± 0.05
Mean cell volume (MCV) fl	78 ± 6	81 ± 6	86 ± 9
Mean cell Hb (MCH) pg	27 ± 2	27 ± 3	29 ± 4
Mean cell Hb conc (MCHC) g/l	340 ± 20	340 ± 30	340 ± 30
Reticulocytes × 10⁹/l	30-100	30-100	30-100
White cell count × 10⁹/l	11 ± 5	10 ± 5	9 ± 4
Neutrophils × 10⁹/l	1-7	1.5-8	2-8
Lymphocytes × 10⁹/l	3.5-11	6-9	1-5
Monocytes × 10⁹/l	0.2-1.0	0.2-1.0	0.2-1.0
Eosinophils × 10⁹/l	0.1-1.0	0.1-1.0	0.1-1.0
Lymphocyte subsets (×10⁹/l)*			
CD3	1.5-5.4	1.6-4.2	0.9-2.5
CD4	1.0-3.6	0.9-2.9	0.5-1.5
CD8	0.6-2.2	0.6-2.0	0.4-1.2
CD4/CD8 ratio	1.0-3.0	0.9-2.7	1.0-3.0
Pl... × 10⁹/l	200-550	200-490	170-450

Epidemiology of anemia

Anemia is affecting up to one-third of the global population. Prevalence of anemia mainly increases with age and in pregnant women and in elderly patients with nutritional deficiency (iron, folic acid, b12).[8]

Pathophysiology of anaemia
1. Increased Rbc destruction
2. Deficient/defective erythropoiesis can [9]

Symptoms of anaemia

The most common symptoms are weakness, shortening of breath, pale or yellow skin, dizziness, irregular heartbeat , cold hands and feet, tingling in feet and hands lost sense of touch, wobbly gait, dementia, etc. [10]

Evaluation of anemia
1. Complete blood count
2. Corrected reticulocyte count = percent reticulocytes x (patient's HCT/normal HCT)
3. Check the mcv
● MCV (<80 fl) : Thalassemia, Iron deficiency, etc
● MCV (90-100fl) : Aplastic anemia, Renal failure, etc
● MCV (>100 fl): b12/folate levels, MDS, Hypothyroidism,etc [11][12]

Differential diagnosis

Anemia of chronic disease: renal failure, underlying malignancies, and autoimmune conditions. Macrocytic anemia with b12/ folate deficiency: consider in a patient with paraesthesia, vegans, gastric bypass surgeries. Hemolytic anemia seen in patients with jaundice, dark urine.

Prognosis

The prognosis for anemia depends mainly on the cause of anemia. Usually, good prognosis are mainly seen in nutritional deficiencies if treated early and adequately. [11]

Complications

Multiorgan failure and even death can be seen in anemia, if it remains undiagnosed for a prolonged period of time. Premature labor and giving birth to lbw babies [13]. Complications are predominantly seen in the older population due to multiple comorbidities [14].

IV.   Results

The study included 1,500 determinations of hemoglobin out of which 944 are females and 556 are males. The hemoglobin is categorized as mild, moderate and severe as mention above. Vicenarians (20-30yrs) shows maximum number of anemic cases and lowest hemoglobin concentration seen in 10-20 and 20-30 years of age group. Females and males have similar hemoglobin concentration until the onset of puberty; after puberty males have a rapid increase in Hb concentration reaching plateau of about 14 gm/dl at age 20 and experience progressive decline after 45 years of age. Therefore, our study shows males with 50-60 years of age group have maximum number of cases whereas females with 20-30 years of age group shows majority of cases. The highest prevalence of mild anemia and moderate anemia seen in 50-60 years and 40-50 years of age group respectively. After puberty, the prevalence of anemia is constantly seen in 50% of females.

In our study we have also done age wise categorization of anemia in which age group of 10-20 years shows maximum cases of moderate anemia,10-20 years shows severe anemia, 20-30 years shows severe anemia, 30-40 years shows mild anemia, 40-50 years shows moderate abnemia,50-60 years shows mild anemia,60-70 years mild anemia and >70 years shows moderate anemia.

V.   Discussion

In this retrospective observational study, we have taken routine clinical data of patients of sims patients. Anemia is present in the majority of 20-30 years of age group, females after onset of puberty and late middle aged adult males. The gender difference is mainly seen after the menarche period in women indicating the iron deficiency anemia as main cause of anemia. It is estimated that anemia accounts for 12.8% of maternal mortality in Asia.

The highest prevalence of anemia seen in age group of 20-30 years; which mainly comprise of youth and common cause of anemia among them is nutritional deficiencies due to sedentary lifestyle. Hormonal changes in females, poor bioavailability of b12 in typical Indian veg diet, chronic drug abusers, etc.

Age group of more than 50 years shows mild to moderate anemia. Anemia is also quiet frequently diagnosed in old individuals and is a key indicator of various reactive, clonal conditions and many underlying diseases like myelodysplastic syndrome, chronic kidney disease, marrow failure syndrome and various nutritional deficiencies.

Child with age group of less than 10 years has shown a smaller number of cases and mainly categorized as moderate anemia. Most common cause of anemia in this age group include inadequate intake together with rapid growth, low birth weight and GI losses due to excess consumption of cow's milk.
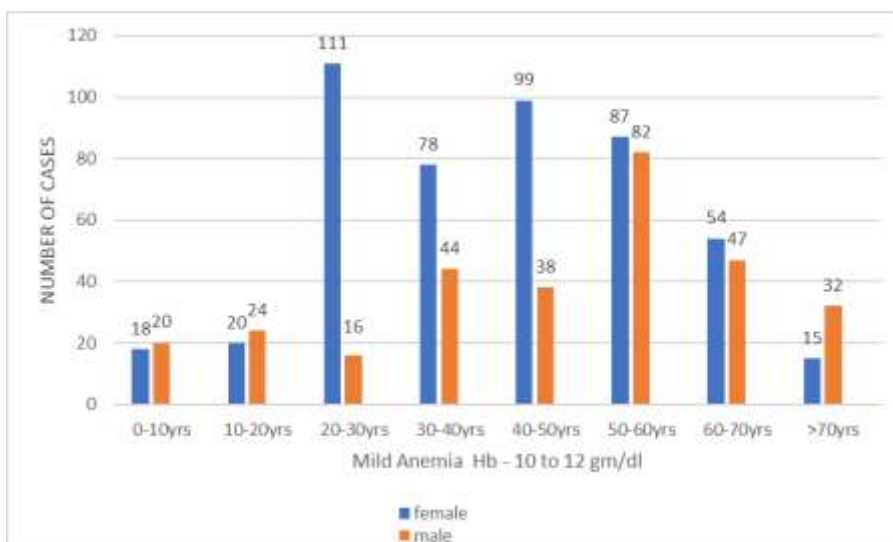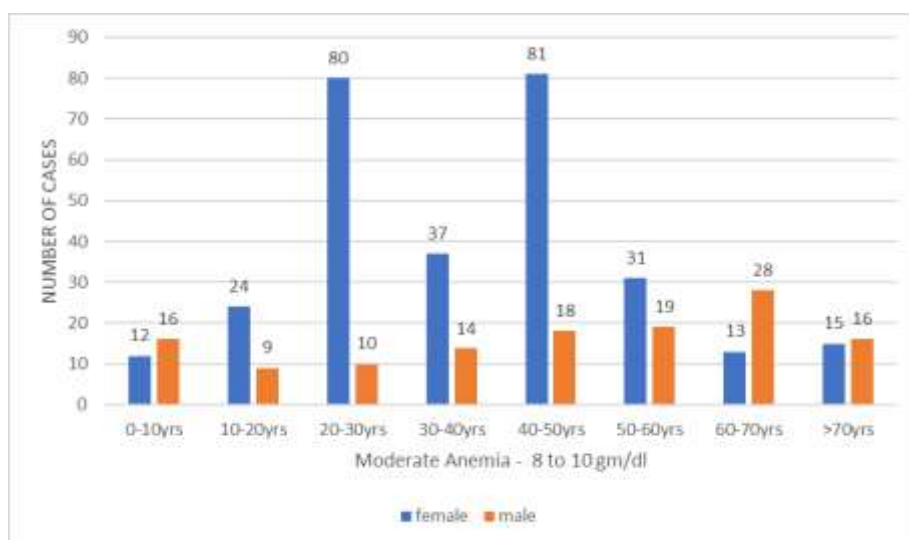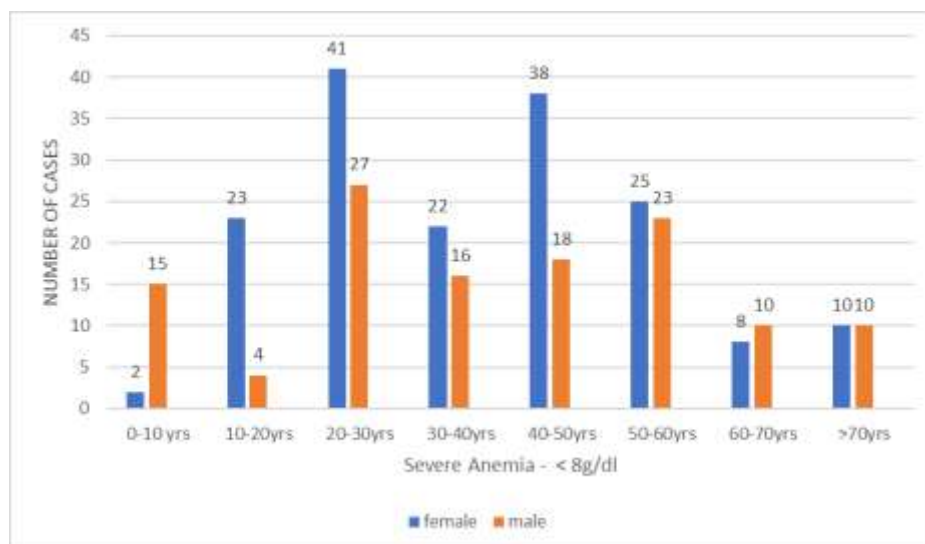
Figure 1

Figure 2

Figure 3

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