e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2024; 16(4); 595-598

Original Research Article

A Hospital-Based Study to Evaluate Treatment Response to Anemia of Various Types in Females

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Received: 06-02-2024 / Revised: 14-03-2024 / Accepted: 28-04-2024
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Conflict of interest: Nil

Abstract

Aim: The aim of the present study was to evaluate treatment response to anemia of various types in females admitted in our tertiary care hospital.

Methods: The present study was conducted in the Department of Medicine, Mata Gujari Memorial Medical College, Kishanganj, Bihar, India from January 2019 to December 2019. A total of 150 females were selected and divided 50 in each group and there were three groups (12-30years) (31-50years) (more than 50years).

Results: The incidence of moderate anemia is maximum among the three age groups. The incidence of moderate grade of anemia is maximum in all three age groups. The causes of anemia in the three age groups which shows that the iron deficiency is the most common type of anemia in all the three age groups. The improvement in hematological indices in iron deficiency anemia cases in different ages showed that the hematological indices such as Hb, HCT, MCV has significant p values and henceforth prove that they improve with the iron supplementations. The improvement in hematological indices in megaloblastic anemia cases in different ages which showed that the hematological indices such as Hb, HCT, MCV has significant p values in age group (12-30years) and (31-50years) but only Hb and HCT improved in (age group >50years) henceforth megaloblastic anemia improve faster in younger age groups. There was significant p value for hematological index Hb and HCT and hence suggestive of significant improvement.

Conclusion: In the present study the incidence according to grades of severity is maximum for moderate grade of anemia having the highest number of cases in the lower start of the society. This suggest that poverty causing lack of balanced diet, illiteracy ,lack of awareness as the important factors leading to the development of anemia. The present need of the health care system is to develop the awareness among the females about importance of balanced diet, regular checkup, menstrual hygiene.

Keywords: Anemia, females, iron, folic acid, erythropoietin, response

Introduction

One-third of the global population is affected by anemia, with almost 1.2 billion individuals suffering from iron deficiency anemia (IDA). IDA is the leading cause of years lived with disability among women around the world. [1] In India, the most common cause of anemia in pregnancy is iron deficiency (ID) due to poor diet and inadequate antenatal care. IDA is highly prevalent in Indian pregnant women, with around 47% of women suffering from anemia during pregnancy. IDA during pregnancy can lead to maternal as well as fetal morbidity and mortality. Varying definitions of anemia during pregnancy have been proposed. Centre of Disease Control (CDC) defines anemia in pregnancy as hemoglobin (Hb) less than 11 g/dL in the first and third trimester and less than 10.5 g/dL in the second trimester, whereas World Health Organisation (WHO) and Indian Council of Medical Research (ICMR) defines it as Hb values less than 11 g/dL. [2] Postpartum anemia (PPA) is a major clinical condition commonly noted in majority of Indian women following childbirth, with prevalence varying from 4 to 27%. PPA adversely affects the critical initial interaction between mother and newborn which may lead to developmental deficits in infants of mothers with PPA. [3]

According to FOGSI General Clinical Practice Recommendations (GCPR) on Management of IDA

in Pregnancy, there are four groups of tests available for assessment of IDA: 1) Estimation of red blood cells (RBC) parameters and indices like hemoglobin, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), etc.; 2) Assessment of iron stores in terms of serum iron, total iron-binding capacity (TIBC), serum ferritin, etc.; 3) Estimation of free erythrocyte protoporphyrin (EPP); 4) Assessment of iron uptake by measuring the soluble serum transferrin receptor (sTfR) and soluble transferrin receptor-log [ferritin] (sTfR-F) index. [4] Decrease in the Hb level, serum iron, serum ferritin level, transferrin saturation and an increase in total iron-binding capacity is the classic laboratory findings of IDA. It is always advisable to investigate the complete blood count and serum ferritin for correct diagnosis.

Inadequate treatment of anemia and non-compliance due to frequent gastrointestinal adverse effects are very common with oral iron. Even in compliant patients with ongoing blood losses or inflammatory conditions, oral iron fails to compensate the iron demand due to limited intestinal absorption. [5] Parenteral iron therapy reduces the need for blood transfusions in the antenatal and postpartum periods. These non-dextran preparations have a better safety profile, can be given more rapidly and in larger doses and replenish iron stores in a short duration. [6]

The aim of the present study was to evaluate treatment response to anaemia of various types in females admitted in our tertiary care hospital.

Materials and Methods

The present study was conducted in the Department of Medicine, Mata Gujari Memorial Medical College, Kishanganj, Bihar, India from January 2019 to December 2019. A total of 150 females were selected and divided 50 in each group and there were three groups (12-30years) (31-50years) (more than 50years).

Three groups were formed by simple random sampling. Each individual was chosen randomly and entirely by chance, such that each individual has the same probability of being chosen at any stage during the sampling process, and each subset of k individuals has the same probability of being chosen for the sample as any other subset of k individual.

Inclusion Criteria

- All women (more than 12 years) visiting tertiary health care centre with Hb level less than 12gm/dl.

Exclusion Criteria

- Pregnant females.
- Females less than 12 years.

The females after their history taking, clinical examination and laboratory diagnosis were treated. In case of iron deficiency anemia, the females were given the supplement of iron tablet containing elemental iron 100mg twice a day for 3 months. The patients with megaloblastic anemia were treated with syrup containing cyanocobalamin 5 mcg, ferrous fumarate 100mg and folic acid 0.5mg per 5 ml of the syrup taking 5ml BID for three months. The patients with hemolytic anemia were treated with blood transfusions. The patient with anemia due to chronic disease in females with chronic kidney disease were treated with erythropoietin 50-100 units/kg IV 3 times weeks for 3 months and were follow up to see the response to the treatment. Hemoglobin estimation was done by Sahli's method. CBC was done by Sysmex automated hematology analyzer. Peripheral smear examination was done after blood films stained with Romanowsky stains such as Wright's stain, Giemsa stain or Diff-Quik stains for the detection of white blood cell, red blood cell and platelet abnormalities. On the basis of peripheral smear examination, the anemia were classified as: Microcytic hypochromic anemia, macrocytic normochromic anemia and normocytic normochromic anemia. Cell lineage study was done by bone marrow aspiration. Serum ferritin level was measured with enzyme linked immunosorbent assay. The normal range of Sr.ferritin is 12-300nanogm/ml. Serum vitamin B12 level was measured by Roche Modular P chemistry analyzer. The normal range of Sr. vitamin B12-200-900 Nano gm/ml. Serum LDH (Lactate dehydrogenase) levels were also measured. LDH level is 140U/L-280U/L. Hemoglobin electrophoresis was done by electrophoresis machine. The expected normal range for HbA2 is between 1.7% and 3.2% in normal subjects, while in β-thalassemia carriers when it is between 4.0% and 7%. HbA2 values are considered borderline when between 3.2% and 3.8%. Samples with these levels need further investigation for possible normal HbA2 thalassemia. The normal range for HbF is usually less than 1.5% of total hemoglobin.

Results

Table 1: Incidence of anemia according to grades of severity

Severity of anemia	12-30 years	31-50 years	>50 years
Mild anemia	3	3	7
Moderate anemia	20	27	28
Severe anemia	27	20	15

The incidence of moderate anemia is maximum among the three age groups. The incidence of moderate grade of anemia is maximum in all three age groups.

Table 2: Type of anemia in study groups

Type of anemia	12-30 years	31-50 years	>50 years
Iron deficiency anemia	36	30	32
Megaloblastic anemia	12	19	14
Hemolytic anemia	1	00	00
Anemia of chronic disease	1	1	4

The causes of anemia in the three age groups which shows that the iron deficiency is the most common type of anemia in all the three age groups.

Table 3: Improvement in hematological indices in iron deficiency anemia cases after supplementation of iron supplementations

Age group	12-30 years			31-50 years			>50 years		
	Before t/t	**After t/t**	**P Value**	**Before t/t**	**After t/t**	**P Value**	**Before t/t**	**After t/t**	**P Value**
Hb	8.22	10.23	0.000	8.588	11.058	.000	8.93	11.45	.000
HCT	25.52	33.31	0.000	25.09	34.83	.000	25.59	36.42	.000
MCV	68.50	77.66	0.000	67.95	77.67	.000	68.38	79.60	.000
MCH	22.11	23.93	0.001	23.67	24.56	.152	23.79	25.02	.038
MCHC	31.86	30.91	0.209	34.35	31.88	.020	34.86	31.67	.000

The improvement in hematological indices in iron deficiency anemia cases in different ages showed that the hematological indices such as Hb, HCT, MCV has significant p values and henceforth prove that they improve with the iron supplementations.

Table 4: Improvement in hematological indices in anemia of chronic disease cases after treatment with erythropoietin

	Before t/t	**After t/t**	**p value**
Hb	7.67	9.84	0.000
HCT	24.86	35.14	0.000
MCV	68.14	82.86	0.001
MCH	21.14	23.29	0.182
MCHC	30.86	28.14	0.223

There was significant p value for hematological index Hb and HCT and hence suggestive of significant improvement.

Discussion

Anemia is a major public health problem worldwide, particularly in females. The importance of anemia is a major public health problem throughout the world and its widely recognized. In India, it is classified as a major public health problem as it is estimated that 52% of non- pregnant women of reproductive age are anemic. [7]

The incidence of moderate anemia is maximum among the three age groups. The incidence of moderate grade of anemia is maximum in all three age groups. The causes of anemia in the three age groups which shows that the iron deficiency is the most common type of anemia in all the three age groups. Tesfaye et al [8] studied that the requirement for iron in fact doubles during adolescence as compared to younger age. There is a significant increase in the requirement of iron from preadolescent level of approximately 0.7-0.9 mg iron per day to as much as 1.37-1.88 mg per day in adolescent boys and 1.40-3.27 in adolescent girls. This is the reason for higher prevalence of iron deficiency anemia in females of age group (12-30years).After treatment, it was observed that the p value is significant as we compare the pre and post

treatment red cell indices. There is significant improvement of red cell indices after receiving the treatment for the period of 3 months.

The improvement in hematological indices in iron deficiency anemia cases in different ages showed that the hematological indices such as Hb, HCT, MCV has significant p values and henceforth prove that they improve with the iron supplementations. The improvement in hematological indices in megaloblastic anemia cases in different ages which showed that the hematological indices such as Hb, HCT, MCV has significant p values in age group (12-30years) and (31-50years) but only Hb and HCT improved in (age group >50years) henceforth megaloblastic anemia improve faster in younger age groups. There was significant p value for hematological index Hb and HCT and hence suggestive of significant improvement. The hemoglobin electrophoresis result shows elevated level of HbA2 and HbF. The study done by Galanello et al [9] shows that the total annual incidence of symptomatic individuals is estimated at 1 in 100,000 throughout the world.

Measurement of the serum ferritin concentration is the most accurate test to diagnose IDA without any underlying inflammation. According to the NIHFW, serum ferritin concentration < 30 µg/L together with Hb concentration < 11 g/dL is diagnostic for anemia during pregnancy. [10] As per FOGSI's GCPR, serum ferritin below 15 µg/L indicates iron depletion in all stages of pregnancy and below 30 µg/L treatment should be initiated.[4] There is variation in serum ferritin thresholds used to define iron deficiency in pregnancy. This variation leads to challenges in interpreting the results of clinical interventions managing iron deficiency in pregnancy. [11]

Conclusion

In the present study the incidence according to grades of severity is maximum for moderate grade of anemia having the highest number of cases in the lower start of the society. This suggest that poverty causing lack of balanced diet, illiteracy,lack of awareness as the important factors leading to the development of anemia. The present need of the health care system is to develop the awareness among the females about importance of balanced diet, regular check up, menstrual hygiene. The oral supplements have good response to treatment and the compliance for the patient is better than injectables. Hence it's the need of an hour to implement the early diagnostic tool of anemia at various community centers including schools and colleges and to create awareness.

References

1. Camaschella C. Iron deficiency. Blood, J Am Soc Hematol. 2019;133(1):30–39.
2. Tandon R, Jain A, Malhotra P. Management of iron deficiency anemia in pregnancy in India. Indian J Hematol Blood Trans. 2018;34(2): 204–215.
3. Ministry of Health and Family Welfare Government of India. Anemia Mukt Bharat: Operational Guidelines: Intensified National Iron Plus Initiative (I-NIPI) for programme managers 2018
4. FOGSI. FOGSI General Clinical Practice Recommendation, Management of Iron Deficiency Anaemia in pregnancy[Internet]. Mumbai: FOGSI; 2017
5. Scott LJ. Ferric carboxymaltose: a review in iron deficiency. Drugs. 2018;78(4):479–493.
6. Pasricha SR, Tye-Din J, Muckenthaler MU, Swinkels DW. Iron deficiency. Lancet. 2021 Jan 16;397(10270):233-248.
7. Rammohan A, Awofeso N, Robitaille MC. Addressing Female Iron-Deficiency Anaemia in India: Is Vegetarianism the Major Obstacle?. International Scholarly Research Notices. 2012;2012(1):765476.
8. Tesfaye M, Yemane T, Adisu W, Asres Y, Gedefaw L. Anemia and iron deficiency among school adolescents: burden, severity, and determinant factors in southwest Ethiopia. Adolescent health, medicine and therapeutics. 2015 Dec 15:189-96.
9. Galanello R, Origa R. Beta-thalassemia orphanet. Journal of Rare Diseases. 2010; 5 (11):1172-75.
10. Rastogi A. Anaemia during pregnancy (Maternal anemia) [Internet]. National Health Portal India. MoHFW, Government of India.
11. Daru J, Allotey J, Peña-Rosas JP, Khan KS. Serum ferritin thresholds for the diagnosis of iron deficiency in pregnancy: a systematic review. Transfus Med. 2017;27(3):167–174.