

Assessment of Compliance and Impact of Oral Iron Therapy among Females with Nutritional Deficiency Anemia Visiting Outpatient Department

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Abstract:

Introduction: Anemia is a condition in which the number of red blood cells or the hemoglobin concentration within them is lower than normal. The most common nutritional cause of anemia is iron deficiency, although deficiencies in folate, vitamins B12 are also important causes.

Aims: To find out the compliance and impact of oral iron therapy in nutritional deficiencies anemia among females attending outpatient department.

Material and Methods: A prospective observational study was conducted to assess the compliance and impact of oral iron therapy. Females who were diagnosed with anemia on complete blood count with microcytosis were included.

Results: Total 421 patients were enrolled in study. Out of 91 (21.61%) were suffering from moderate anemia and 330 (78.39%) from mild anemia. 276 patients (65.56 %) were fully complied and 145 (34.44 %) were partially complied. 349 patients (82.89%) achieved normal hemoglobin levels after end of study period.

Conclusions: Oral iron therapy is effective tool to improve the health status of women and to decrease the sufferings. Compliance need to be improved by educating and raising awareness about anemia and easy treatment options.

Keywords: Oral Iron and Folic Acid, Iron Deficiency Anemia, Compliance, Nutritional Deficiency Anemia.

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Introduction

Though anemia is one of the oldest public health concerns and is being pursued since long, with easily and widely available resources for its detection and treatment, still it is one of the common health problems, even in modern era. Iron deficiency anemia most widespread micronutrient condition worldwide, compromising of men, women, and child's health and socioeconomic status [1].

Iron is a vital component that utilized in the production of hemoglobin and healthy RBCs. Iron deficiency is extremely common in underdeveloped countries, where the condition is often associated with poverty and lack of opportunity for detection and treatment.

A long term diminished iron balance results in exhausted iron reserves, causing in iron deficiency anemia [2,3]. Iron deficiency, predominantly due to insufficient dietary iron consumption, is considered the most common nutritional deficiency leading to anemia. Deficiencies in vitamin A, folate, vitamin B12 and riboflavin can also result in anemia. Anemia occurs when there isn't enough hemoglobin in the body to carry oxygen to the organs and tissues. Anemia can be caused by poor nutrition, infections, chronic diseases, heavy menstruation, pregnancy issues and family history [5].

Scope of the problem

As per National Family Health Survey [5] (2019-21), prevalence of anemia is 57.0 % in women and 59.1 % in adolescent girls, and 52.2 % in pregnant women [6]. Whereas worldwide, Anemia is estimated to affect half a billion women 15–49 years of age and 269 million children 6–59 months of age. In 2019, 30% (539 million) of non-pregnant women and 37% (32 million) of pregnant women aged 15–49 years were affected by anemia. The population groups most vulnerable to anemia include children under 5 years of age, particularly infants and children less than 2 years of age, menstruating adolescent girls and women, and pregnant and postpartum women [7]. Anemia is diagnosed based on blood hemoglobin concentrations falling below specified thresholds established based on age, sex, and physiological status. It is considered a symptom of an underlying condition(s) [7].

Oral Iron Therapy: A Convenient Solution:

Oral iron therapy has transformed the treatment of nutritional deficiency anemia. Easily available and cost-effective, oral iron supplements provide a convenient means of replenishing iron levels in the body. Commonly used formulations include ferrous sulfate, ferrous gluconate, and ferrous fumarate, each with its own advantages and considerations. [6,8] Although oral iron supplements are convenient, its pharmacokinetics are influenced due to various factors such as bioavailability and absorption. Non-heme iron is absorbed less efficiently than heme iron. To augment absorption, it is recommended to be taken with vitamin C, which enhances non-heme iron absorption. [8,9]

Patient compliance and Education:

Main challenge in the effective implementation of oral iron therapy is patient's compliance, which often alters the desired goals of the therapy. Treating physician has a critical role in educating patients about the significance of adherence to the treatment, probable side effects, and approaches to enhance iron absorption [8]. Oral iron therapy can cause gastrointestinal side effects, like nausea and constipation, gastritis; metallic taste etc. which can impact patient compliance.

World Health Organization (WHO) endorses that a women should take a daily dosage of 30 to 60 mg of elemental iron (The equivalent of 30 mg of elemental Iron is 150 mg Ferrous Sulfate heptahydrate, 90 mg ferrous fumarate or 250 mg ferrous gluconate) and 0.4 mg folate as part of treatment of iron deficiency anemia for 3 months. [10] In spite of Information, Education and Communication (IEC) strategy in the district under this study, only 28.4% of pregnant women took IFA tablets as per the NFHS-5 survey. [11] There

are no published reports available on the determinants of compliance with iron supplementation in the district where study is conducted, even though the prevalence of anemia is high. Therefore, this study explored the determinants of compliance with iron supplementation. This can assist in propose of increasing the compliance of iron supplementation, thus reducing the prevalence of anemia in women.

Aims and Objectives:

1. To quantify the impact on the rise in hemoglobin levels post oral iron with folic acid therapy.
2. To assess the compliance with iron and folate supplementation, and associated factors

Material and Methods:

Study design: Prospective observational

Study duration: 4 months

Place of study: Outpatient department of Swami Ramanand Teerth Government Medical college Ambajogai.

Sample size: All anemic female patients who were diagnosed with microcytic, hypochromic anemia on complete blood count during study period and started on oral iron and folic acid therapy.

Inclusion criteria

1. Females attending outpatient departments who are diagnosed with mild to moderate type of nutritional deficiency anemia (microcytic and / or hypochromic anemia) and those who are started with oral iron and folic acid supplements.
 - Microcytosis (MCV < 82 fL), Hypochromic MCV- <27 pg, MCHC- <32%) [12]
 - Age groups: All females above 13 years diagnosed with hypochromia and / or microcytosis on complete blood count were included.
 - All those who gave consent to participate in the study.

Exclusion criteria [13]

1. Patients who were severely anemic (Hb- below 8g/dl on complete blood count) and require treatment other than oral iron and folic acid supplements.
2. Patient who failed keep follow up after initiation of oral iron therapy.
3. Thalassemia and anemia of chronic disorders.
4. All those who did not give consent to participate in the study.

Data analysis: Analysis of complete blood count reports with details of parameters like Hemoglobin level (HGB) (below 12 g/dl), mean cell hemoglobin (MCH), total RBC, mean cell volume (MCV), mean cell hemoglobin (MCH), Mean corpuscular hemoglobin concentration (MCHC) level along

with information on age, educational background and contact number for keeping follow up was collected and entered into Microsoft excel.

On diagnosis of anemia patients were given counseling before starting oral iron and folic acid

therapy about the importance of taking the treatment for prescribed duration and keeping follow up for reassessing the hemoglobin levels. Compliance was analyzed by showing empty iron tablet strips during follow up.

Table: 1 Grades of anemia [14]

Grade	Hemoglobin values
Normal	12–14g/dl for women and 12.5-16g/ dl for men
Mild	10g/dl to levels within normal limits
Moderate	8.0–10.0g/dl
Severe	6.5–7.9g/dl
Life threatening	< 6.5 g/dl

Then data were analyzed using descriptive statistical methods.

Ethics committee clearance: The study was approved by the Institutional Ethics committee.

Results: Data was collected as per inclusion and exclusion criteria. A total of 421 patients were included in study.

Table 2: Age demographics

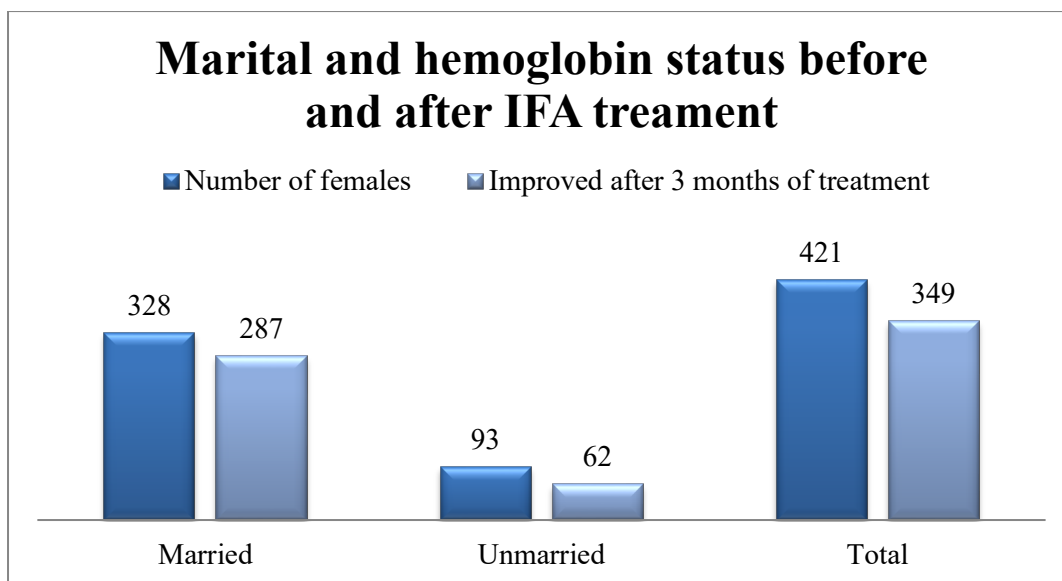
Age wise distribution of study population		
Age group	Number of patients	Percentage
13-19 yrs	55	13.06 %
20-24 yrs	37	8.78 %
25-29 yrs	46	10.92 %
30-34 yrs	77	18.28 %
35-39 yrs	80	19.00 %
40-44 yrs	68	16.15 %
45-49 yrs	36	8.55 %
Above 50 yrs	22	5.22 %
Total	421	

Total 421 females were included in study, by excluding patient who did not kept follow up. Maximum patient were from age group 30 yrs to 44 yrs, (53.44%).

Table 3: Educational status of the study population

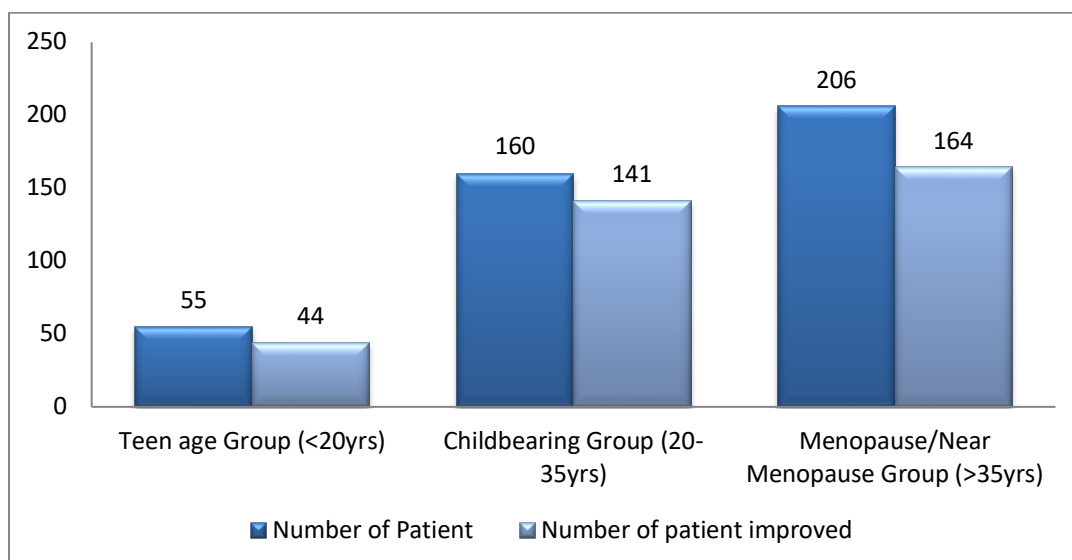
Education level	Number of patients	Percentage of ANEMIC before oral iron therapy	Normal Hb after 3 months of treatment	Percentage of improvement in Hb after oral iron therapy
Illiterate	22	5.22 %	15	68.18 %
Primary education below 4 th	37	8.78 %	33	89.18 %
Secondary 5 th -10 th	146	34.67 %	120	82.20 %
Higher secondary	173	41.09 %	145	83.28 %
Graduate	43	10.21 %	36	83.37 %
	421		349	

Most of the study population was educated up to higher secondary and secondary level. Highest improvement was seen among educated group whereas least improvement in hemoglobin was seen in illiterate group.



Graph 1: Marital status of the study population

As per marital status, maximum study population females were married and improvement in hemoglobin was better in married women than unmarried females.



Graph 2: Occurrence of anemia according to adolescent group, childbearing age and near Menopause/ Menopause age and their respective improvement in hemoglobin after oral iron and folic acid treatment

Maximum improvement in hemoglobin was seen in child bearing age group as compared to teen age group and menopausal group.

Body mass index: Maximum number of patient who showed improvement was seen in patient having normal body mass index. Severely underweight patient showed less improvement.

Table 4: Body mass index

Body Mass	Index Fre-quency	Percent	Normal Hb after 3 months of treatment	Percentage of improvement in Hb after oral iron therapy
Severely underweight	25	5.93 %	16	64.00 %
Underweight	79	18.76 %	63	79.74 %
Normal	264	62.70 %	229	86.74 %
Overweight	53	12.58 %	41	77.35 %
Total	421		349	

Grades of Anemia

Table 5: Grades of anemia and effect of oral iron therapy

Hemoglobin levels	Number of anemic patients before oral iron therapy		Number of women become normal after 3 months of oral iron therapy	
	Number of patients	Percentage	Number of patients	Percentage
Moderate anemia (8-9.9 gm/dl)	91	21.61 %	78	85.71 %
Mild 10 g/dl -11.9 g/dl	330	78.39 %	271	82.12 %
Total	421		349	

Table 6: Compliance of oral iron and folic acid in anemic patients

Age groups in years	Number of anemic patients	Number of fully complied patient		Number of partially complied patient	
		Fully complaint (n)	Number of patient with Normal Hb after 3 months	Partially compliant (n)	Number of patient with Normal Hb after 3 months
13-19 yrs	55	36 (65.45 %)	36 (100 %)	19 (34.55%)	14
20-24 yrs	37	20 (54.05 %)	20 (100 %)	17 (45.95%)	13
25-29 yrs	46	28 (60.86%)	28 (100 %)	18 (39.14 %)	13
30-34 yrs	77	54 (70.12 %)	53 (98.14%)	23 (29.88%)	11
35-39 yrs	80	59 (73.75 %)	57 (98.14%)	21 (26.25 %)	8
40-44 yrs	68	43 (63.23 %)	41(95.34)	25 (36.77%)	10
45-49	36	22 (61.11 %)	21(95.45%)	14 (38.11 %)	8
50 and above	22	14 (63.63 %)	12 (85.71%)	8 (14.29 %)	4
Total	421	276 (65.56 %)	268 (97.1%)	145 (34.44 %)	81

Compliance towards iron and folic acid is as shown in above table, 65.56 % of patients fully complied with iron and folic acid, whereas 34.44 % patients partially complied.

Discussion:

Nutritional anemia caused due to the deficiency of essential micronutrients in the diet. Iron is the most necessary micronutrient and a part of hemoglobin-moiety along with folate and vitamin B12. Despite increased food sufficiency and security in India, malnutrition continues to remain one of the most serious public health challenges. Malnutrition was the leading risk factor for disease burden in India in 2017, with an anemia prevalence of 60% in children younger than 5 years and 54% in women of reproductive age. [15]

In this study, patient who were diagnosed with microcytic, hypochromic anemia on complete blood count in outpatient department were given counseling for need of treatment with oral iron and folic acid for 3 months. They were educated about anemia, need for treatment and to keep the follow up every month for continuation of treatment and for checking compliance by showing empty strips of tablets. Ferrous sulfate and folic acid tablets were used for three months.

In this study, their mean age was 37.11 ± 4.07 years. Most of the participants (53.44%) were aged

between 30 years to 44 years. As per results shown by Saibani et al. mean age was 27.86 ± 5.54 and 30.39.7% had completed high school. [16] As per this study analysis, patient's education levels were 5th to 10th level (34.67%) and higher secondary level (41.09%), graduate were 10.21 % and illiterate were 5.22%.

About marital status, 77.90 % patients were married and 87.50 % of married women were having normal hemoglobin levels after 3 months of treatment as compared to unmarried females (22.10 %) of which only 66.66% were having normal hemoglobin after 3 months. Moreover as per age groups, child bearing age group (20-35 yrs) showed maximum normalization of hemoglobin levels.

Out of 421 study population, 91 (21.61%) patient were suffering from moderate anemia and 330 (78.39 %) patients were suffering from mild anemia of which 78 (85.71%) and 271 (82.12%) were having normal hemoglobin after 3 months of oral iron therapy. About compliance, this study concluded that 65.56% (276) patient fully complied whereas 34.44% (145) patient partially complied with 3 months treatment. Partial compliance means the patient has missed more than 2 consecutive doses on multiple occasions. Similar study conducted in pregnant women by Mithra P, et al. showed compliance of 64.7%. [17] Another study conducted by Pal PP et.al in rural area of West

Bengal found the compliance to be 62%. These study results are similar to our study. The reasons for partial compliance in our study was forgetfulness, absence of symptoms of anemia, inertia to consume tablets for such a long duration, fear of adverse drug reaction and experience of few side effects. Similar reasons were stated in various other studies such as Yadav KD et al. [19], Augustine AT et al, [20] Manasa K et al. [21]

In a study by Agarwal AK et al. among 653 pregnant women reported the prevalence of anemia and compliance to IFA tablets was 80% and 67%, respectively. [22] As per Augustine AT et al. Of 208 women, 170 (81.74%) mothers found to be complied oral iron therapy. The reason of skipping of IFA tablets by most of the mothers was forgetfulness, fear of side effects. [20]

Conclusion

This study was aimed to assess the compliance and impact of oral iron therapy and to set an example for patients and healthcare workers, to motivate them to start and adhere to the oral iron therapy. Oral iron therapy proved to be a valuable intervention in the fight against nutritional deficiency anemia. Its cost, convenience and effectiveness make it essential tool in improving the health of individuals affected by iron deficiency.

Compliance can be improved by educating and awareness campaigns about anemia and suitable treatment options.

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