

To Assess the Impact of Iron Supplementation on Quality of Life of Anaemic Patients

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Abstract: Iron is an important essential mineral and hence should be incorporated in healthy diet plan. Iron is key ingredient in hemoglobin as it is responsible for carrying oxygen in blood to each and every part of the body. Lack of iron or insufficient supply of iron in diet leads to iron deficiency anaemia which is still one of the most prominent diet related health problem worldwide especially in underdeveloped and developing countries. Iron deficiency can lead to numerous health problems like fatigueness, hair loss, pregnancy complications, heart problems and death etc. Iron deficiency anemia can be well controlled and treated with various oral iron supplementations, which is widely available under prescription drug.

Keywords: Anaemia, haemoglobin, myoglobin, malnutrition, haematocrit, ferritin, gastrointestinal

1. Introduction

In 2019, global anaemia prevalence was 29.9% (95% uncertainty interval (UI) 27.0%, 32.8%) in women of reproductive age, equivalent to over half a billion women aged 15 - 49 years. Prevalence was 29.6% (95% UI 26.6%, 32.5%) in non - pregnant women of reproductive age, and 36.5% (95% UI 34.0%, 39.1%) in pregnant women. Since 2000, the global prevalence of anaemia in women of reproductive age has been stagnant, while the prevalence of anaemia in pregnant women has decreased slightly. (WHO 2021)¹

Failure to reduce anaemia may result in millions of women experiencing impaired health and quality of life, and may impair children's development and learning. Anaemia is an indicator of both poor nutrition and poor health. While in India the prevalence of anaemia is 55%.

Iron deficiency anemia (inadequate amount of red blood cells caused by lack of iron) is highly prevalent in less - developed countries but also remains a problem in developed countries where other forms of malnutrition have already been virtually eliminated. Iron deficiency is not the only cause of anemia, but where anemia is prevalent; iron deficiency is usually the most common cause. The prevalence of anemia, defined by low hemoglobin or haematocrit, is commonly used to assess the severity of iron deficiency in a population

Hemoglobin used to define anemia in people living at sea level

Sr. No	Age or sex group	Hemoglobin below (g/dL)
1	Children 6 months to 5 years	11.0
2	Children 5 - 11 years	11.5
3	Children 12 - 13 years	12
4	Pregnant women	11
5	Non pregnant women	12
6	Men	13

WHO/ UNICEF/ UNU, 1997²

IDA and anaemia of chronic disease commonly coexist in population. Apart from iron deficiency due to dietary intake, another root cause of iron anemia co - exists with Malaria by the protozoa Plasmodium falciparum. It causes anaemia by rupturing RBCs and suppressing production of RBCs. It is also a major public health problem especially in pregnant women, menstruating women and women using intrauterine devices. It is also prevalent in gastrointestinal disorder, cardiovascular disease, Chronic Kidney Disease (CKD), HIV, parasite infestations, colon cancer patients, rheumatoid arthritis and inflammatory bowel disease.

Although, IDA is curable and preventable thus can be controlled by various dietary supplementation. Medical care starts with establishing the diagnosis and reason for the iron deficiency. For the Management of anaemia preparations of iron is administered by orally, by intramuscular or intravenous injection. However in most patients, the iron deficiency is treated with oral iron therapy and the underlying etiology being corrected so the deficiency does not reoccur. Among all therapy, oral iron supplementation remains the therapy of choice in treatment. Number of preparations of different iron salts are available either as single drug preparation or as formulations with added vitamins, minerals etc. Each preparation is claimed to be better tolerated with fewer side effects and more effective.

To treat and prevent anaemia different posology and methods are being used by medical practitioners. Iron and iron salts of organic acid should be given for the treatment or prophylaxis of iron deficiency anaemia. The ferrous iron absorbed by the mucosal cells of the duodenum and this is bound to a protein to form ferritin. Ferritin in the mucosal cells releases iron into the blood, where it is bound to transferrin and passed into the liver, spleen, and bone marrow as iron stores. These stores are a reserve of iron for synthesis of hemoglobin, myoglobin, and iron containing enzymes. Each preparation differs in its congener. Despite being efficacious and with good bioavailability, certain

ferrous salts have several disadvantages particularly the high incidence of gastrointestinal side effects.³ Iron supplementation in IDA patients improves not only hemoglobin levels, but also physical function, vitality, and general health perception of quality of life. Since assessment of patient reported outcome (PRO) its effect on health - related quality of life is unknown. The improvement in QOL that occurs with treatment with oral iron can provide profound benefits to their patients' well - being. An increased understanding of the association between anemia and HRQOL is important [^{4, 5}]

Objectives: -

To assess the impact of iron supplementation on quality of life of anaemic patients

2. Methodology

This was observational study where 148 anaemic patient data was analyzed. Women and men aged between 25 - 45 years with anaemia were selected. Biochemical estimation of blood hemoglobin was done. This study was conducted in the Government and private hospitals in Thane, Maharashtra. The patients with mild, moderate anaemia were selected, iron supplement as per treated doctor given and the responses after two and six months were observed as per requirement. Pretested questionnaire was used to collect the data of quality of life of patient before and after iron supplement. Total 100 females and 48 males were participated in this study. Parameters like pain was considered and checked the quality of life before and after iron supplement.

Inclusion Criteria: -

- 1) Male and Female
- 2) Age 25 - 45 years
- 3) Patients with or without medical condition induced iron deficiency anemia

Exclusion Criteria: -

- 1) Allergy to oral iron supplements including wheat grass juice
- 2) Cardiac patients
- 3) Blood transfusion or Patients who received a blood transfusion within 1month prior to the study
- 4) Severe Gastrointestinal Bleeding
- 5) End Stage Renal Disease (ESRD)
- 6) Patients who awaiting renal transplantation and renal transplanted patients
- 7) Pregnant women and nursing mothers
- 8) Patients on anticoagulant drugs like Warfarin

Duration:

Total duration of four to six months is needed to complete first, second and last visit of the single subject. Here the subject was observed for maximum six months with three months interval time period.

Side effects:

Taken at normal doses, iron supplements may cause **upset stomach**, stool colour changes, and sometimes **constipation**.

Limitations:

The study is restricted for IDA from Thane cities. It is expected to provide information regarding improvement in iron deficiency anemia and quality of life after iron supplement.

Supplementation and analysis:

Biochemical estimation of blood hemoglobin was done before and after consumption of iron supplement. Total 148 subjects were involved where 100 were females and 48 were males. Iron supplement was taken by the subject from day one of the detection of the IDA. Hemoglobin of every IDA detected was observed for third and sixth month interval. Subjects both female and male once attained 12g/dl and 13g/dl haemoglobin respectively, had recovered from IDA hence discontinued for further observations in this study. However rests of the subjects were continued with iron supplementation and observation upto six months.

3. Result

The aim study was to assess the impact of iron supplementation on quality of life of anaemic subjects. The data on quality of life was gathered through RAND 36 - Items Short Form Survey. The responses of selected 148 anaemic subjects were observed. The responses in this survey were taken three times i. e. pre - test, after three months (Post - test), after six months (post test).

Repeated measures ANOVA were used as statistical tool for data analysis. Results shown in table 1

Table 1: Descriptive Statistics of Scores on Rand 36 - items Health Survey for Assessment of Quality of Life in Anaemic Patients in Different Stages of Study Period

Stages	N	Quality of Life (Pain)	
		Mean	S. D.
Pre - test	148	50.05	18.47
After 3 months (Post - test)	148	61.08	23.51
After 6 months (Post - test)	148	65.45	23.37
F (2, 294) = 26.84, p<.01			

The F ratio = 26.84 revealed significant difference in mean scores on pain during different time intervals of this experimental study. It indicate that pre - test means (M=50.05), after 3 months (M=61.08) and after 6 months (M=65.45) differ significantly at.01 level of statistical significance.

Since F ratio from repeated measure ANOVA was found to be statistically significant, the mean scores on quality of life for different time intervals were compared. Result shown in table 2

Table 2: Pairwise Comparisons of Mean Scores on Quality of Life (Pain) Calculated During for Different Time Intervals

Mean (I)	Mean (J)	Mean Difference (I - J)
Pre - test	Before Iron Supplement	11.03*
Post - test	After 3 months	15.40*
Post - test	After 6 months	4.36

* Significant at.05 level

It was observed that mean scores after commencement of this experimental study on quality of life as assessed by Rand's 36 - items health survey was found to be significantly higher as compared to pre - test mean scores. The mean difference of 11.03 was statistically significant ($p < .05$).

It was observed that the post test mean scores on quality of life as assessed by RAND 36 - Items Short Form Survey was found to be significantly higher as compared to pre - test mean scores. The mean difference of 15.40 was statistically significant ($p < .05$).

The mean scores after six months and post test on quality of life was not found to be statistically significant as can be seen through mean difference of 4.36, $p > .05$

Table 3: Effect of Iron Supplementation on Hb Levels of Anaemic Patients

Status	Pre - test		After 3 months (Post - test)		After 6 months (Post - test)	
	N	%	N	%	N	%
Anaemic	148	100%	40	27.1%	10	6.7%
Non - Anaemic	00	00	108	72.9%	138	93.3%
Total	148	100%	148	100%	148	100%

The impact of iron supplementation on Hb levels can be seen after six months with 93.3% patients became non anaemic

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