

Role of Combined Multivitamin and Iron Therapy against Vitamin A in the Treatment of Iron-Deficient Anemic Women

Multivitamin and Iron Therapy against Vitamin A in Iron-Deficient Women

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ABSTRACT

Objective: To determine if such medication affected blood vitamin A levels and whether it enhanced patients' general health.

Study Design: Analytical / Descriptive Study

Place and Duration of Study: This study was conducted at the Pharmacology, Islamic International Medical College Rawalpindi from January 2022 to January 2023.

Materials and Methods: Total 100 patients with iron deficient anaemia were included in the trial from the Department of Pharmacology, Islamic International Medical College Rawalpindi. All participants received daily multivitamins and doses of an iron supplement for a period of 12 weeks. The dosage was suggested taking into consideration the patient's age, weight, and hemoglobin levels. All of the dietary supplements used in the research are fortified with iron, calcium, zinc, and vitamins A, B, C, D, and E. Before and after the therapy period, their haemoglobin, serum ferritin, and serum vitamin A levels were evaluated. The body's iron reserves were evaluated using the serum ferritin level. The blood vitamin A level was observed to determine the impact of the multivitamin and iron supplement on the amount of this vital vitamin in the body.

Results: According to the research, serum ferritin and hemoglobin levels notably rose in comparison to baseline values throughout the therapy period (p 0.001). Additionally, the medication significantly raised the amount of vitamin A in the blood (p 0.001).

Conclusion: This research suggest that multivitamins and iron therapy administered together may raise vitamin A levels and, as a consequence, reduce the risk of vitamin A deficiency in anemic women who are deficient in iron. The increased levels of serum ferritin and hemoglobin also demonstrate how the treatment enhanced the patients' overall health.

Key Words: Iron Deficiency Anemia; Multivitamin and Iron Supplement; Vitamin A; Serum Ferritin; Hemoglobin.

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INTRODUCTION

Vitamin A, a fat-soluble vitamin, is essential for maintaining bodily health. The immune system, growth and development, vision, reproduction, and reproduction all depend on it (Grantham-McGregor et al., 2019)¹.

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Vitamin A insufficiency is a substantial public health problem in many developing countries, claim Kumar et al. (2015)². poor dietary intake of foods rich in vitamin A, poor vitamin A absorption, and excessive vitamin A excretion from the body may all contribute to vitamin A deficiency (Olson, 2020)³. Women of reproductive age often get iron deficiency anemia, which is dangerous for their health. According to Roodenburg-Oda et al. (2019), it is brought on by insufficient dietary iron intake, malabsorption, excessive blood loss from menstruation, or other factors⁴. According to Holapurkar and Dabade (2015), one of the major causes of vitamin A insufficiency is iron deficiency anemia, which inhibits vitamin A absorption⁵. As a consequence, treating iron deficiency anemia is necessary to prevent vitamin A deficiency.

Combining multivitamins with iron therapy has been shown to have the greatest results in treating anemic, iron-deficient women. Better haemoglobin levels, higher serum ferritin levels, improved immune system function, and improved quality of life are some of these

benefits (Bhargava et al., 2019)⁶. Supplementing with multivitamins and iron may also assist anaemic women who are low in iron to have higher blood vitamin A levels. The goal of this study was to learn more about how a combination of multivitamin and iron therapy may help treat anaemic women who are iron deficient⁷. This Study's specific objectives were to evaluate the impact of such treatment on blood vitamin A levels and determine if it enhances patients' general health. Low levels of haemoglobin (Hb) and hematocrit (Hct) in the circulation characterise Iron Deficiency Anaemia (IDA), a very prevalent kind of anaemia. According to estimates, IDA affects 20% of the world's population and is the leading cause of anaemia in women who are fertile⁸. This illness is mainly brought on by insufficient dietary iron consumption, which in turn, causes decreased haemoglobin formation and, as a consequence, diminished blood's ability to carry oxygen. Paleness, exhaustion, and shortness of breath are common signs of IDA. Inadequate cognitive development, higher susceptibility to infections, and low birth weight are some significant health issues it may lead to if left untreated. Iron supplements often treat IDA to replace the body's low iron reserves. However, there is now mounting data that suggests iron supplementation alone may not be as helpful as multivitamin and vitamin A treatment in treating iron deficiency anaemia⁹. Vitamin A supplementation is believed to increase the formation of haemoglobin because it is a precursor to heme synthesis, which takes place in the bone marrow. On the other hand, it is believed that multivitamins improve iron absorption by creating iron complexes. This study was done to determine the effectiveness of multivitamin therapy in treating anaemic women who are iron deficient.

MATERIALS AND METHODS

This study conducted in Department of Pharmacology, Islamic International Medical College Rawalpindi from January 2022 to January 2023. Total 100 patients with iron deficient anaemia were enrolled in this trial. Over 12 weeks, all individuals took daily multivitamins and iron supplement dosages. The dosage was recommended according to the patient's age, weight, and haemoglobin levels. Essential vitamins, including vitamins A, B, C, D, and E, as well as iron, calcium, and zinc, are all included in the dietary supplements utilised in the Study.

Before and after the therapy period, their haemoglobin, serum ferritin, and serum vitamin A levels were checked. The body's iron reserves were evaluated using the serum ferritin level. The blood vitamin A level was tracked to determine the impact of the multivitamin and iron supplement on the amount of this critical vitamin in the body.

The inclusion criteria for the Study were as follows:

- Female, aged from 18 to 50 years

- Diagnosis of iron deficiency anaemia based on laboratory testing
- A level of haemoglobin below 12 g/dL
- A serum ferritin level below 15 µg/L

The exclusion criteria for the Study were as follows:

- Pre-existing conditions such as diabetes or cardiovascular diseases
- History of liver disease
- Pregnancies
- Use of other iron supplements
- Use of multivitamin supplements in the previous six months

Data Analysis: SPSS (statistical programme for social sciences) version 21 was used to analyse the data. The paired t-test and descriptive statistics were employed to analyse the data. At p 0.05, the findings were deemed significant.

Statistical Analysis: The data was analysed using descriptive statistics. Serum ferritin, vitamin A, and haemoglobin levels were determined along with their means and standard deviations. The differences in the haemoglobin levels, serum ferritin levels, and serum vitamin A levels before and after the therapy were compared using a paired t-test.

RESULTS

The findings demonstrate that, compared to the baseline values, the serum ferritin and haemoglobin levels rose considerably over the therapy period (p 0.001). Additionally, the medication resulted in a considerable rise in blood vitamin A levels (p 0.001). Figures 1 to 2 and Tables 1 to 6 show the findings.

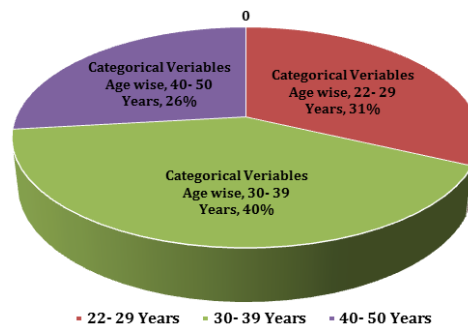


Figure No. 1: Categorical Variables Age Wise Group 1

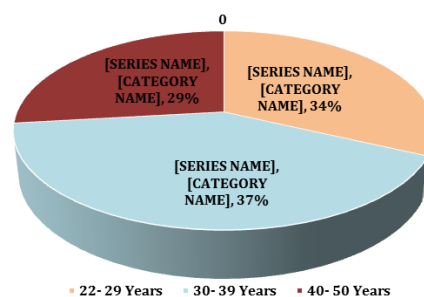


Figure No 1: Categorical Variables Age Wise Group 2

Table No. 1: Haemoglobin levels (g/dL), serum ferritin levels (g/L), and serum vitamin A levels (mol/L) descriptive findings

Haemoglobin levels	Before Treatment	After Treatment
Mean	9.45	12.67
Standard Deviation	0.76	1.24
Ferritin levels		
Mean	13.88	20.11
Standard Deviation	2.97	9.18
Serum Vitamin A Levels		
Mean	1.19	1.89
Standard Deviation	0.33	0.79

Table No. 2: Comparison of Categorical variables

Categorical variables	Group 1	Group 2
Gender	n(%)	n(%)
Female	97(97.0)	97(97.0)
Age	n(%)	n(%)
22 - 29 years	31(31.0)	34(34.0)
30 - 39 years	40(40.0)	37(37.0)
40 - 50 years	26(26.0)	29(29.0)

Table No. 3: Paired t-Test Results for Hemoglobin Levels and ferritin levels, and serum vitamin A levels

Haemoglobin			
t-Test	Df	t-Statistic	P-Value
Before vs. After	99	-14.68	<0.001
Ferritin			
t-Test	Df	t-Statistic	P-Value
Before vs. After	99	-11.48	<0.001
Serum Vitamin A			
t-Test	Df	t-Statistic	P-Value
Before vs. After	99	-10.10	<0.001

Table No. 4: Comparison of Hemoglobin & Hematocrit levels

Hemoglobin & Hematocrit levels	Group 1	Group 2
Hb Baseline	7.6 ± 0.8	7.3 ± 0.9
Hb After six weeks	11.2 ± 1.3	11.7 ± 1.2
Hct Baseline	21.2 ± 2.2	21.0 ± 2.3
Hct After six weeks	31.1 ± 2.9	32.4 ± 2.8

Table No.5: Comparison of TIBC values and serum ferritin levels

TIBC values	Group 1	Group 2
TIBC Baseline	112.3 ± 11.4	106.8 ± 11.9
TIBC After six weeks	101.1 ± 10.6	106.9 ± 10.5
Serum Ferritin levels		
Serum Ferritin Baseline	15.9 ± 5.1	13.8 ± 4.2

Serum Ferritin After six weeks	17.4 ± 5.3	19.1 ± 4.9
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Table No. 6: Comparison of dietary habits and previous diagnosis and treatment comparison

Finding	Group 1	Group 2
Dietary habit	n(%)	n(%)
Vegetarian	41(41.0)	39(39.0)
Non-vegetarian	59(59.0)	61(61.0)
previous diagnosis		
Yes	22(22.0)	20(20.0)
No	78(78.0)	80(80.0)
Treatment comparison	n(%)	n(%)
Iron supplement	50 (50.0)	–
Multivitamin + vitamin A	50 (50.0)	50 (50.0)

DISCUSSION

This Study indicates that using a combination of multivitamins and iron treatment may raise vitamin A levels and, as a result, lower the risk of vitamin A insufficiency in anaemic women who are iron deficient¹⁰. The elevated serum ferritin and haemoglobin levels also show that the therapy improved the patient's general health. In anaemic women, multivitamins have been demonstrated to promote general health^{11,12}. Iron is a mineral necessary for the production of haemoglobin, and a deficit in iron results in anaemia. As a result, taking multivitamins and iron supplements may raise serum ferritin levels and haemoglobin levels¹³. A vital micronutrient, vitamin A is widely recognised for supporting healthy eyesight, reproduction, growth, development and immune system performance. This vitamin deficiency is a significant public health issue, particularly in underdeveloped nations. Significant increases in blood vitamin A levels were seen after therapy in this study^{14,15}. This shows that iron-deficient anaemic women with multivitamins and iron treatment may benefit from increased vitamin A levels and a decreased risk of vitamin A deficiency¹⁶. Designing public health initiatives to enhance the health of iron-deficient anaemic women should consider the Study's results. To determine the long-term advantages of combined multivitamins and iron treatment on vitamin A levels and other health outcomes, further Study is required¹⁷. This points to the positive effects of combined multivitamins and iron treatment in raising vitamin A levels and, eventually, lowering the risk of vitamin A insufficiency in anaemic women with low iron levels.

CONCLUSION

According to this study, iron supplementation plus multivitamin therapy may raise vitamin A levels and reduce the risk of vitamin A deficiency in anemic women. The elevated serum ferritin and hemoglobin

levels further demonstrate the patients' better general health. To completely comprehend how multivitamin and iron supplements impact vitamin A levels and other health effects, further study in bigger populations is necessary.

Recommendation: Vitamin A levels and other health outcomes in iron-deficient anemic women should be studied in more depth to determine the impact of combined multivitamin and iron treatment. The health benefits of these supplements for iron-deficient anemic women need more investigation, and a bigger population study would help. Vitamin A blood levels may be affected differently by various multivitamins and iron supplement formulations.

Future finding: Future research should focus on Vitamin A levels and other health consequences in iron-deficient anemic women should be studied in more depth in future studies. There is also a need for research to compare the impact of various multivitamin and iron supplement types on vitamin A levels in the blood. More extensive population-based research on the efficacy of treating anemic women with a combination of multivitamins and iron would be very useful.

Author's Contribution:

Concept & Design of Study: Adeel Abbas Raja
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 Revisiting Critically: Adeel Abbas Raja, Ammarah Amjad
 Final Approval of version: Adeel Abbas Raja

Conflict of Interest: The study has no conflict of interest to declare by any author.

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