Effect of Specific Nutritional Supplementation Desupplementation and Resupplementation on Folic Acid and Iron Status of Anemic College Women

P. Amarnath, Fulltime Ph.D Scholar

Grace Helina, Vice Chancellor (O), and

P.K.Senthilkumar, Assistant Professor, Department of Exercise Physiology and Biomechanics, Tamilnadu Physical Education and Sports University, Chennai 127.

Abstract

The iron deficiency anemia is very common among women, which affects their health and health related physical fitness. It is the interest of the investigator to find out the effect of nutritional supplementation, desupplementation and resupplementation on Folic acid and iron status of anemic college women. Through this research the investigator aimed to finding out whether, specific nutritional supplementations improve anemic status of the college women. To achieve the purpose of the study, the investigator conducted a sample survey to assess the symptoms of the anemic condition. Based on the survey, the investigator selected 15 anemic college women students as subjects. The selected anemic college women we are provided with specific nutritional supplementation (Lotus Stem and Egg) for eight weeks. After the completion of 8 weeks nutritional supplementation, they were stopped the nutritional supplementation for 8 weeks and this phase was considered as desupplementation phase. After the completion of desupplementation period of 8 weeks the subjects were again started providing with nutritional supplementation and this phase of 8 weeks was considered as resupplementation phase. Prior to the experimental treatments, all the subjects were measured of their, Folic acid and Iron status. The differences among means of initial, nutritional supllementation, desupplementation and resupplementation scores were subjected to statistical treatment using repeated analysis of variance (Repeated ANOVA). When the F ratio was found to be significant, Scheffe's post hoc test was used to find out the paired mean significant difference. The results of the study proved that there was significant improvement due to specific nutritional supplementation,desupplementation and resupplementation on animic status of the college women on Folic acid and Iron.

Key words: Folic acid and Iron

Introduction

Nutritional deficiency is almost impossible to avoid in these modern times. With our busy lifestyle, the ever-tempting convenience of fast food, it is now very difficult to enjoy excellent daily nutrition.

Iron deficiency anemia is the common type of anemia, and is known as sideropenic anemia. It is the most common cause of microcytic anemia. Iron deficiency anemia occurs when the dietary intake or absorption of iron is insufficient, and hemoglobin, which contains iron, cannot be formed. The principal

cause of iron deficiency anemia in premenopausal women is blood lost during menses. Iron deficiency anemia can be caused by parasitic infections, such as hookworms. Intestinal bleeding caused by hookworms can lead to fecal blood loss and heme/iron deficiency. Chronic inflammation caused by parasitic infections contributes to anemia during pregnancy in most developing countries.

Folic acid deficiency is usually caused by an inadequate intake of folic acid, a vitamin mainly supplied by the fresh green leafy vegetables, mushrooms, lima beans and kidney beans. This disorder is most common in the poor and elderly (due to poor eating habits), in heavy alcohol drinkers, and in persons afflicted with intestinal disorders such as Crohn's disease or celiac sprue.

Almost two-thirds of iron in the body is found in hemoglobin, the protein in red blood cells that carries oxygen to tissues. Smaller amounts of iron are found in myoglobin, a protein that helps supply oxygen to muscle, and in enzymes that assist biochemical reactions. Iron is also found in proteins that store iron for future needs and that transport iron in blood. Iron stores are regulated by intestinal iron absorption.

Nutrition supplementation is a preparation intended to supplement the diet and provide nutrients, such as vitamins, minerals, fiber, fatty acids, or amino acids that may be missing or may not be consumed in sufficient quantities in a person's diet.

The best source of iron is red meat, especially beef and liver. Chicken, turkey, pork, fish, and shellfish also are good sources of iron. The body tends to absorb the iron from meat better than iron in other foods. However, other foods also can help to raise the iron levels (Fox 1988).

Review of Related Literature

Radjen, et.al., (2011) evaluated the effects of daily oral iron supplementation on body iron status, and the maximal oxygen uptake (VO2max) in female athletes with latent iron deficiency, as well as with iron-deficiency anemia. A total of 37 female volleyball players were included in the study. Seventeen female athletes had latent iron deficiency, and 20 ones iron deficiency anemia. Both groups were divided into the experimental and the control group. The experimental groups received a daily oral iron supplement (200 mg ferrous sulfate), for a two-month training course. Iron status was determined by serum parameters as follows: red blood cells count, hemoglobin concentration, serum iron and ferritin levels, an unsaturated iron binding capacity, total iron binding capacity and transferrin saturation. VO2max was determined by an indirect test. Statistical difference between the latent iron deficient group versus the iron deficient anemic group

was found regarding VO2max ($p < 0.001$). There were correlations between hemoglobin concentration and VO2max in the latent iron deficient group, as well as in the iron deficient anaemic group ($p < 0.05$). After two months, there was a significant increase in VO2max in all groups (from 7.0% to 18.2%). Values of VO2max at the end of training period were significantly different (45.98 +/- 1.76 vs 42.40 +/- 1.22 mL/kg/min; $p < 0.001$) between the experimental and the control group only in female athletes with iron deficiency anemia. After the supplementation, markers of iron status were significantly higher in supplemented groups than in the controls. VO2max was significantly lower in the iron deficient anemic group versus the latent iron deficient group. Iron supplementation during a two-month training period significantly improved body iron status in the iron deficient female athletes with or without anemia, and significantly increased VO2max only in the subjects with iron deficiency anemia.

Statement of the Problem

The purpose of the study was to determine the effect of specific nutritional supplementation, desupplementation and resupplementation on Folic acid and Iron status of anemic college women.

Hypothesis

It was hypothesized that the nutritional supplementation, desupplementation and resupplementation would significantly alter Folic acid and Iron status of anemic college women.

Methodology

The purpose of the study was to investigate the effect of specific nutritional supplementation, desupplementation, and resupplementation on Folic acid and Iron status of anemic college women.To achieve the purpose of the study, the investigator conducted a sample survey to assess the symptoms of the anemic condition. Based on the survey, the investigator selected 15 anemic college women students as subjects. For this study, Random group design was followed. The selected anemic college women we are provided with specific nutritional supplementation (Lotus Stem and Egg) for eight weeks. This period is supplimentation period. After the completion of 8 weeks nutritional supplementation, the specific nutritional supplimentation was stopped, the nutritional supplementation for 8 weeks and this phase was considered as desupplementation phase. After the completion of desupplementation period of 8 weeks the subjects were again started specific nutritional supplementation and this phase of 8 weeks was considered as resupplementation phase. Prior to the experimental treatments, all the subjects were measured of their anemic status

such as, Folic acid and iron. The data obtained were considered as initial scores of the Folic acid and iron. Data were obtained at the end of nutritional supplementation phase (completion of 8 weeks of nutritional supplementation), end of desupplementation (completion of 16 weeks), and end of resupplementation phase (completion of 24 weeks). The differences among means of initial, nutritional supllementation, desupplementation and resupplementation scores were subjected to statistical treatment using repeated analysis of variance (Repeated ANOVA). When the F ratio was found to be significant, Scheffe's post hoc test was used to find out the paired mean significant difference.

Results of the Study

The descriptive statistics on anemia profile Folic Acid due to specific nutritional supplementation, desupplementation and resupplementation on college women are presented in Table I. The nutritional supplementation and resupplementation were done under the supervision of dieticians.

Table-I

Descriptive Statistics on Folic Acid

As shown in Table I, the initial Folic Acid mean score (IS) of the college women was 2.97, after 8 weeks nutritional supplementation (ANS) mean score of Folic Acid was 4.08, the scores obtained after 8 weeks desupplementation (ADS) mean was 3.92, the scores obtained after 8 weeks resupplementation (ARS) mean was 4.28. The statistical significance of the differences in means due to nutritional supplementation, desupplementation and resupplimentation was tested through repeated measures of ANOVA and the results are presented in Table II.

Table II

Computation of Repeated Measures ANOVA on Folic acid

Source	Sum of Squares	df	Mean Squares	F
Subjects	8.61	14		5.91*
Trials	15.22	3	5.07	
Residual	36.09	42	0.86	
Total	29.47	59		

Significant at 0.05 level 2.76

The obtained F value 5.91 is greater than the required table F value of 2.76 to be significant at 0.05 level. Hence, it was proved that there was a significance difference in Folic Acid due to nutritional supplementation, desupplementation and resupplementation.

Since significant differences were found, the obtained results were further subjected to post hoc analysis using Scheffe's test and results are presented n Table III.

Table-III

Multiple Comparisons Showing Pairs of Means Scores on Folic Acid under Different Phases

Mean Scores Under Different Phases				Mean Difference	Required C.I
IS	ANS	ADS	ARS		
2.97	4.08			1.11*	0.97
2.97		3.92		0.95	0.97
2.97			4.28	1.31*	0.97
	4.08	3.92		0.17	0.97
	4.08		4.28	0.20	0.97
		3.92	4.28	0.36	0.97

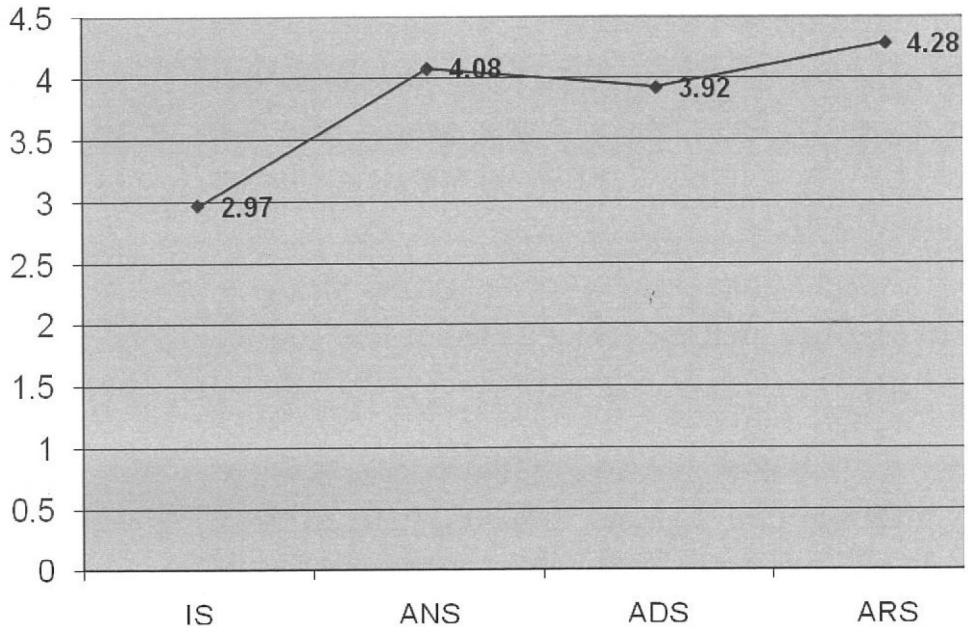
* Significant at 0.05 level IS: Initial Score; ANS: After Nutritional Supplementation Score; ADS: After desupplementation Score; ARS : After Resupplementation Score.

Table III shows the following paired mean comparisons were significant at 0.05 level as the obtained mean differences between Initial Score and after Nutritional Supplementation 1.11 was greater than the required value of 0.97. It also compared between Initial Score and after Resupplementation Score 1.31 was greater than the required value of 0.97. However, when compared between other groups there was no significant difference at 0.05 level.

The mean gains under different phases of supplementation are presented through line graph for better understanding of the results of the study in Figure 1.

Figure-1

Showing Line Graph on Mean Scores of Folic Acid under Different Phases of Supplementation among College Women



Results on Iron

The descriptive statistics on anemia profile Iron due to specific nutritional supplementation, desupplementation and resupplementation on college women are presented in Table IV. The nutritional supplementation and resupplementation were done under the supervision of dieticians.

As shown in Table IV, the initial Iron mean score (IS) of the college women was 29.53, after 8 weeks nutritional supplementation (ANS) mean score of Iron was 59.27, the scores obtained after 8 weeks desupplementation (ADS) mean was 51.73, the scores obtained after 8 weeks resupplementation (ARS) mean was 62.27.

Table-IV

Descriptive Statistics on Iron

S.No	Different Phases of Training	Mean	Standard Deviation
1	Initial Scores (IS)	29.53	5.18
2	After Supplementation (ANS)	59.27	11.91
3	After Desupplementation (ADS)	51.73	11.35
4	After Resupplementation (ARS)	62.27	11.91

The statistical significance of the differences in means due to nutritional supplementation, desupplementation and resupplimentation was tested through repeated measures of ANOVA and the results are presented in Table V.

Table-V

Computation of Repeated Measures ANOVA on Iron

Source	Sum of Squares	Df	Mean Squares	F
Subjects	4532.60	14		6.47*
Trials	9844.07	3	3281.36	
Residual	21304.07	42	507.24	
Total	15992.60	59		

*Significant at 0.05 level 2.76

The obtained F value 6.47 is greater than the required table F value of 2.76 to be significant at 0.05 level. Hence, it was proved that there was a significance difference in Iron due to nutritional supplementation, desupplementation and resupplementation.

Since significant differences were found, the obtained results were further subjected to post hoc analysis using Scheffe's test and results are presented n Table VI

Table-VI

Multiple Comparisons Showing Pairs of Means Scores on Iron under Different Phases

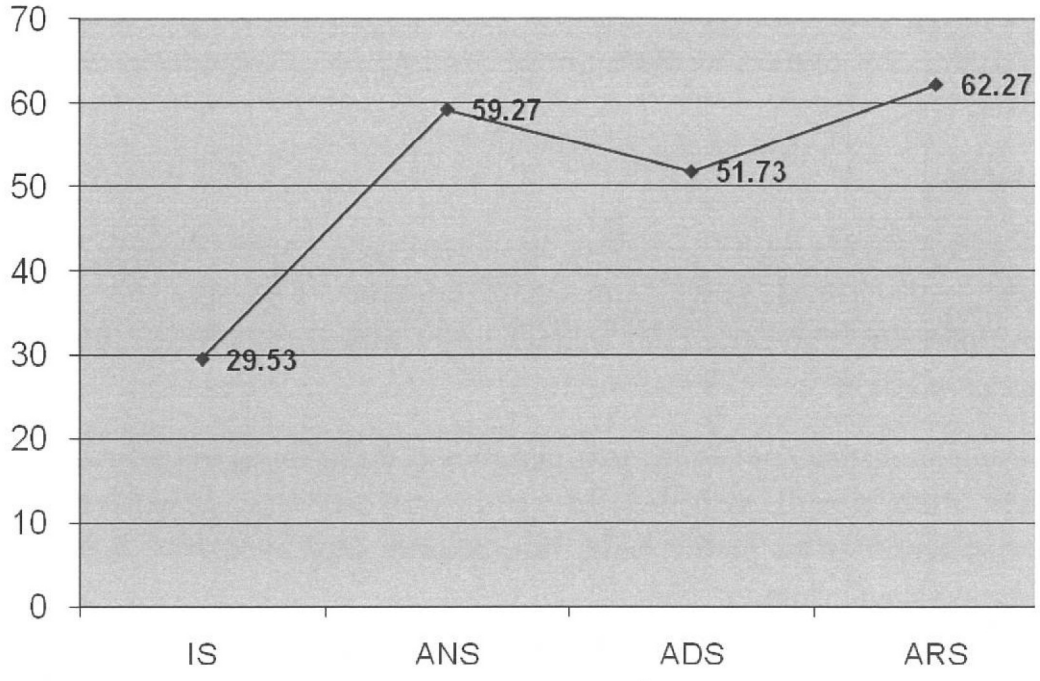
Mean Scores Under Different Phases				Mean Difference	Reqd C.I
IS	ANS	ADS	ARS		
29.53	59.27			29.73*	23.66
29.53		51.73		22.20	23.66
29.53			62.27	32.73*	23.66
	59.27	51.73		7.53	23.66
	59.27		62.27	3.00	23.66
		51.73	62.27	10.53	23.66

* Significant at 0.05 level. IS: Initial Score; ANS: After Nutritional Supplementation Score; ADS: After desupplementation Score; ARS : After Resupplementation Score

Table VI shows the following paired mean comparisons were significant at 0.05 level as the obtained mean differences between Initial Score and after Nutritional Supplementation 29.73 was greater than the required value of 23.66. It also compared between Initial Score and after Resupplementation Score 32.73 was greater than the required value of 23.66. However, when compared between other groups there was no significant difference at 0.05 level.The mean gains under different phases of supplementation are presented through line graph for better understanding of the results of the study in Figure 2.

Figure-2

Showing Line Graph on Mean Scores of Iron under Different Phases of Supplementation among College Women



Discussions on Findings

Iron deficiency anemia is the common type of anemia, and is known as sideropenic anemia. It is the most common cause of microcytic anemia. Iron deficiency anemia occurs when the dietary intake or absorption of iron is insufficient, and folic acid, which contains iron, cannot be formed. Researchers have found that nutritional supplements can help one to have the optimum health deserved and minimize the risk of diseases. Tiwari et.al., (2011) found iron supplementation on iron deficient women, Haemoglobin (Hb) levels along with antioxidant enzymes, were found significantly increased ($P < 0.01$) in anemic women after treatment.

The results presented in Table III proved that the significant differences were between initial score and after nutritional supplementation score and initial score and after resupplementation score. The results of the study proved that the difference between after nutritional supplementation score, and after resupplementation score have significantly improved folic acid status of the anemic college women. And the hypothesis that the nutritional supplementation and resupplementation phases would improve folic acid of the college women was accepted at 0.05 level.

The results presented in Table VI proved that the significant differences were between initial score and after nutritional supplementation score and intial score and after resupplementation score. The results of the study proved that the difference between after nutritional supplementation score and after resupplementation score have significantly improved Iron status of the anemic college women. And the hypothesis that the nutritional supplementation and resupplementation phases would improve Iron status of the college women was accepted at 0.05 level.

Conclusions

1. It was concluded that there was significant differences between initial and after nutritional supplimentation period; and initial and after resupplementation period have significantly improved folic acid of the anemic college women.

2. It was concluded that there was significant differences between initial and after nutritional supplementation period; and initial and after resupplementation period have significantly improved Iron status of the anemic college women.

References

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