Effect of Aerobic Exercise and Nutritional Supplementation on Iron Deficiency in College Women Students

S. Indira, Director of Physical Education, JBAS College for Women,

Grace Helina, Professor and Head Dept. of Exercise Physiology and Biomechanics, TNPESU, Chennai.

R. Desingu Rajan, Director of Physical Education, D B Jain College, Chennai and

Varalakshmi, Director of Physical Education, G.S.S. Jain College, Chennai.

Abstract

The purpose of this study was to find out the effect of Aerobic exercise and nutritional supplementation on Iron deficiency in college women students. The subjects of the study were 90 anemia students and the subjects were assigned into three groups, namely experimental group I, experimental group II, and control group. Experimental group I was given aerobic exercise, experimental group II was given nutritional supplementation and the control group was not given any treatment. Initial blood samples before the experiments were collected from all the three groups to test their hemoglobin, serum iron and red blood cells. After the experimental period of six weeks to the groups in the respective treatments, blood samples were collected to assess their level of hemoglobin, serum iron and red blood cells. The difference between the initial scores and final scores on selected criterion variables were the effect of exercise and nutritional supplementation on the iron deficiency of college women students. The obtained pre and post test scores were subjected to statistical treatment using analysis of covariance ANCOVA was employed. The result reveals significant differences in the effect of Aerobic exercise and nutritional supplement on iron deficiency in college women students.

Key words: Aerobics, Serum iron, Nutritional supplementation on iron deficiency.

Introduction

Fitness is a state which characterizes the degree to which a person is able to function. Ability to function depends upon the physical mental, emotional, social and spiritual components of fitness. Fitness is a key to enjoy life; exercise is an important of a total fitness programme. The modern living has taken all the exercise out of our lives and so in order to get fit and have to put in ball again regular exercise is necessary to develop and maintain an optimal level of health, performance and appearance. Aerobic exercise is physical exercise that intends to improve the efficiency of the cardiovascular systems in absorbing and transporting oxygen to the working muscles.

Nutrition is the science of foods, the nutrients and other substances there in action, interaction and balance in relationship to health and disease, the processes by which the organism digests, absorbs, transports and utilizes nutrients and disposes of their end products. Iron is a part of hemoglobin, the oxygen carrying component of the blood. Iron-deficient people tire easily because their bodies are starved for oxygen. Iron is also part of myoglobin, which helps muscle cells store oxygen. Iron deficiency anemia is the common type of anemia, and is known as sideropenic anemia. Iron deficiency anemia occurs when the dietary intake or absorbson of iron is insufficient, and hemoglobin, which contains iron, cannot be formed.

Hypothesis

It was hypothesized that the exercises and nutritional supplementation would significantly alter serum iron, hemoglobin and red blood cells of the college women.

It was further hypothesized that comparing between the treatment groups; namely, exercises and nutritional supplementation, there would be significant difference in influencing serum iron, hemoglobin and red blood cells of the college women.

Methodology

The purpose of the study was to find out the effect of Aerobic exercise and nutritional supplementation on iron deficiency in college women students. To achieve the purpose of the study, the investigator conducted a sample survey to assess the symptoms of the iron deficiency (anemia). Based on the survey the investigator selected 90 anemia students. To confirm the iron deficiency 90 college women were tested for the hemoglobin levels and the college women who were having less than 12gm/dl hemoglobin were considered as the iron deficient. As the normal adult women required is 12 - 16 gm/. d1 hemoglobin of the 90 checked 72 were identified as iron deficiency and out of 72 students, 45 college women with iron deficiency were considered as the subjects of this study. Experimental Group I was given Aerobic exercise, Experimental Group II was given nutrition supplementation and the Control Group III was not given any treatment.

Statistical Analysis

Analysis of covariance statistical technique was used to test the adjusted mean differences among the treatment groups. If the adjusted post test result was significant, the scheffes post hoc test was used to find out the paired mean significant difference.

Results and Discussion

The statistical analysis comparing the initial and final means hemoglobin due to exercise and nutrition supplementation on iron deficiency among college women in presented in Table

Table-I
Computation of Analysis of Covariance of Hemoglobin
(Total Scores in mg/ dl)

	Exercise group	Nutritional Supplementation group	Control	Source of variance	Sum of Squares	DF	Mean squares	Obtained
Pre Test Mean	11.03	11.03	10.50	Between	0.59	2	0.03	0.86
				Within	14.48	42	0.34	
Post test mean	11.24	12.55	10;88	Between	23.27	2	11.64	24.34*
				Within	20.08	42	0.48	
Adjusted post test mean	11.18	12.50	10.99	Between	20.05	2	10.03	30.19*
				Within	13.61	41	0.32	
Mean Diff.	0.21	1.53	0.38					

Table F ratio at 0.05 level of confidence is 3.23 * Significant

As shown in Table I the obtained F value on the scores of pre test means 0.86 was less than the required F value, which proved that the random assignment of the subjects were successful and their scores in hemoglobin before the training were equal and there was no significant differences. The obtained F value on post test means 24.34 was greater than the required F value of 3.22 and there was a significant difference.

Taking into consideration of the pre test means and post test means adjusted post test means were determined and analysis of covariance was done and the obtained F value 30.19 was greater than the required value of 3.23 and hence it was accepted that the experimental groups has significant mean difference after the experimental period.

Since significant differences were recorded the results were subjected to post hoc analysis using Scheffe's Confidence interval test. The results are presented in Table II

Table-II
Scheffe's Confidence Interval Test Scores on Hemoglobin

Means				Required C1
Exercise	Nutritional supplementation group	Control group	Mean differences	
11.18	12.50		1.32*	0.52
11.18		10.99	0.20	0.52
	12.50	10.99	1.51*	0.52

* Significant

The post hoc analysis of obtained ordered adjusted means proved that there was a significant difference on nutritional supplementation group and control group and nutritional supplementation group and exercise group. There was no significant difference between exercise group and control group.

Results on Serum Iron

The statistical analysis comparing the initial and final means of serum iron due to exercise and nutrition supplementation on iron deficiency among college women is presented in Table, III.

Table-III
Computation of Analysis of Covariance of Serum Iron
(Total scores in mg/ dl)

	Exercise group	Nutritional supplementation group	Control	Source of variance	Sum of squares	DF	Mean squares	Obtained
Pre Test mean	115.00	95.33	80.00	Between	2965.35	2	1482.67	3.58*
				within	17395.80	42	414.19	
Post test mean	116.80	115.73	108.13	Between	650.98	2	325.49	0.76
				within	17866.27	42	428.24	
Adjusted post test mean	108.03	125.92	106.52	Between	3077.70	2	1538.85	29.02*
				within	2174.05	41	53.03	
Mean difference	1.60	20.40	28.13					

Table F ratio at 0.05 level of confidence is 3.22, * Significant

As shown in Table III the obtained F value on the scores of pre test means 3.58 was greater than the required F value, which proved that the random assignment of the subject were not equal, as there was a significant differences. The obtained F value on post test means 0.76 was less than the required F value of 3.22 and there was an insignificant difference.

Taking into consideration of the pre test means and post test means adjusted post test means were determined and analysis of covariance was done and the obtained F value 29.02 was greater than the required value of 3.23 and hence it was accepted that the experimental groups has significant mean difference after experimental period.

Since a significant difference was recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results are presented in Table IV.

Table-IV

Scheffe's Confidence Interval Test Scores on Serum iron

Means				Required C1
Exercise	Nutritional supplementation group	Control group	Mean differences	
108.03	125.92		17.88*	6.62
108.03		106.52	1.51	6.62
	125.92	106.52	19.40*	6.62

* Significant

The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between nutritional supplementation group and control group and nutritional supplementation group and exercise group. There was no significant difference between exercise group and control group.

Results on Red Blood Cells

The statistical analysis comparing the initial and final means of red blood cells due to exercise and nutrition supplementation on iron deficiency among college women is presented in

Table -V
Computation of Analysis of Covariance of Red Blood Cells
(Total Scores in cu mm of blood)

	Exercise group	Nutritional Supplementation group	Control	Source of variance	Sum of Squares	DF	Mean squares	Obtained
Pre Test Mean	5.69	5.15	5.20	Between	2.85	2	1.42	10.54*
				Within	5.67	42	0.14	
Post test mean	5.71	6.32	5.25	Between	8.60	2	4.30	24.49*
				Within	7.37	42	0.18	
Adjusted post test mean	5.55	6.40	5.23	Between	9.26	2	4.63	30.46'
				Within	6.23	41	0.15	
Mean Diff.	0.02	1.17	0.05					

Table F ratio at 0.05 level of confidence is 3.22 * Significant

As shown in Table V, the obtained F value on the scores of pre test means 10.54 was greater than the required F value, which proved that the random assignment of the subjects were not equal, as there was significant differences. The obtained F value on post test means 24.48 was greater than the required F value of 3.22 and there was a significant difference.

Taking into consideration of the pre test means and post test means adjusted post test means were determined and analysis of covariance was done and the obtained F value 30.46 was greater than the required value of 3.23 and 85 hence it was accepted that the experimental groups had significant mean differences after the experimental period.

Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results are presented in Table VI.

Table-VI

Scheffe's Confidence Interval Test on Red Blood Cells

Means				Required C1
Exercise	Nutritional supplementation group	Control group	Mean differences	
5.55	6.40		0.86*	0.35
5.55		5.33	0.22	0.35
	6.40	5.33	1.07*	0.35

* Significant

The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between nutritional supplementation group and control group and nutritional supplementation group and exercise group. There was no significant difference between exercise group and control group.

Discussions on Hypothesis

For the purpose of this research the investigator formulated the hypothesis that the exercises and nutritional supplementation would significantly alter serum iron, hemoglobin and red blood cells of the college women.

The results presented in Tables I, III and V proved that there was significant differences in adjusted post test means as the obtained F values 30.19, 29.02 and 30.46 for hemoglobin, serum iron and red blood cells respectively were greater than the required F value of 3.23 to be significant at 0,05 level. Hence, the hypothesis 1 was accepted at 0.05 level.

The formulated hypothesis 2 stated that comparing between the treatment groups, namely, exercises and nutritional supplementation, there would be significant difference in

influencing serum iron, hemoglobin and red blood cells of the college women.

Conclusions

Based on the analysis of the study the following conclusion were drawn

1. It was concluded that nutritional supplementation significantly altered hemoglobin among iron deficient college women
2. It was concluded that nutritional supplementation significantly altered serum iron among iron deficient college women.
3. It was concluded that nutritional supplementation significantly altered red blood cells among iron deficient college women.

Reference

Clark. S F, (2008), Iron deficiency anemia, **Nut Clin Pract**, 23(2), 128 – 141

Bucher. Charles A & Prentice. William E, (1971), **Fitness for College and Life**, Saint Louis: Santer Clark, 7.

Flersheman. Edwin A, Flersheman (1985), **The Structure and Measurement of Physical Fitness**, Englewood cliffs, New Jersey: Prentice Hall Inc.

Mcalt. DL, & Pananretta. K.S, (2005), Nutrition status of primary school children in Townsville, **Aust J. Rural Health**, (5) 2800.

Fox. Robert A, (1988), **The Complete Hand Book of Components of Diet, Engle wood cliffs**, New Jersey : Pretince Hall Inc, 158.

Thirumalaisamy. R, (1998), **Thesis and Dissertation Writing**, Karaikudi: KPSV Publishers, 18.

* * * * *