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PHYSICAL FITNESS INDEX STATUS OF CYCLISTS IN BIJAPUR DISTRICT WITH SUPPLEMENTATION OF ANTIOXIDANT (ALPHA-TOCOPHEROL)

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ABSTRACT

Aims & Objective: Exercise increases oxygen consumption and causes a disturbance of intracellular pro-oxidants-antioxidant homeostasis. Athletes are exposed to acute and chronic stress that may lead to increased generation of oxidative species. Hence oxidative stress increases in athletes. Antioxidant supplementation is supposed to reduce the cell damage caused due to oxidative stress. However the total scenario regarding use of antioxidant supplementation during endurance exercise is still not clear. Hence an approach has been made in the present study to assess the Physical Fitness Index status of cyclists of Bijapur district with supplementation of Antioxidant (alpha-tocopherol). **Material and Methods :** Forty cyclists belonging to age group 18-19 years, trained under District youth service & sports office were selected as study group. They were divided in to two groups, one experimental (n=19) taking vitamin E (Tab. Evion 200mg/day) and another placebo group (n=18) taking (Tab.pudin hara/day) for 21 days. Control group were selected randomly among 1st MBBS students of BLDEA's Sri BM Patil MC, Bijapur. The Anthropometrical measurements like Age(yrs), Height (cms), Weight (Kg), BSA(sq.mts), BMI(Kg/m²) and Body fat %, Lean body mass were recorded. Physical Fitness Index (PFI) was measured by using Harvard step test.

Result & Conclusion: There was no significant difference in age, height, weight, BSA, BMI and lean body mass, Body fat % between control and study group ($p > 0.05$), But mean score of PFI in study group (84.68 ± 9.79) is significantly higher than control (74.25 ± 3.3) where $p < 0.001$. Where as comparative values of PFI in Experimental and Placebo subjects before & after supplementation of vitamin E didn't show statistically significant differences ($p > 0.05$). In conclusion supplementation of Vitamin E has got no beneficial effect on Physical Fitness Index in Cyclists, But antioxidants may help in reducing the markers of oxidative damage after exercise.

Key words- Physical Fitness Index Cyclists, Antioxidant, alpha- tocopherol

INTRODUCTION

Highly physically active persons who can perform well in various sports and possessing higher values of Physical Fitness Index have capacity to yield larger amount of energy, can perform better in athletic field activities. Determination of PFI is one of the important criteria to assess the cardiopulmonary efficiency

of a subject. Use of physical fitness score as obtained from Harvard Step Test (HST) as a tool for ascertaining the cardiopulmonary fitness status of a subject, especially in field situation has been advocated world over¹. The American Alliance for Health, Physical, Education Recreation and Dance (AAHPERD) recommended this test to study health related physical fitness program in youth². It is also used as a tool to select highly physically active

persons who can perform well in various sports, games or industrial occupation.

Exercise increases oxygen consumption, causes disturbance of intracellular prooxidant-antioxidant homeostasis. Athletes are exposed to acute and chronic stress that leads to suppression of immune system, increased generation of oxidative species thus increase oxidative stress. Dernbach, et al 1993 suggested exercise induced hyperthermia triggers oxidative stress by promoting mitochondrial uncoupling. Vina J., et al 2000^{3,4} reported exhaustive exercise generates free radicals, treatment with antioxidants such as vitamin E & C protects in part against free radical mediated damage in exercise. So the Antioxidant supplementation is supposed to reduce the cell damage due to oxidative stress. Vitamin E deficiency can increase free radical induced tissue injury, decreases life span of cells and diminishes physical activity⁵.

These findings were highly suggestive of fact that a bout of exercise might outstrip the inherent capacity of the protective endogenous antioxidant enzyme system necessitating greater protection and this added protection could come in the form of an exogenous supplement. Sen, C K, 2001⁶ in his review mentioned antioxidant supplementation is likely to provide beneficial effects against exercise induced oxidative tissue damage. Experts agree that if used prudently, oxidants & antioxidants may serve as potent therapeutic tools. Efforts to determine individual needs of athletes and a balanced diet rich in antioxidant supplements are highly recommended. However total scenario regarding use of antioxidant supplementation during endurance exercise is still not clear.

In view of this we have assessed the physical fitness index status of cyclists by supplementation of antioxidant (alpha-tocopherol) in experimental & placebo group in comparison to non athletes (controls).

MATERIAL AND METHODS

Forty cyclists belonging to age group 18-19 years, trained under District youth service & sports office were selected as study group. They were divided into two groups, one experimental (n=19) taking vitamin E (Tab. Evion 200mg/day) and another placebo group (n=18) taking (Tab. pudin hara/day) for 21 days. Control group were selected randomly among 1st MBBS students of BLDEA's BM Patil MC, Bijapur. The ethical clearance was obtained from Ethical committee of BLDEMC as per RGUHS requirements.

After ruling out cardiopulmonary disorders, subjects were asked to come in the morning hours (7-9am) to laboratory 1 hr. after having light breakfast. The Anthropometrical measurements like Age(yrs), Height (cms), Weight (Kg), BSA(sq.mts), BMI(Kg/m²) and Body fat %, Lean body mass were recorded. Physical Fitness Index (PFI) was measured by using Harvard step test⁷. Each subject completed up & down task (24 steps/min) on an 18 inch bench for 3 mins or until exhaustion.

Exhaustion is defined as when the subject could not maintain the stepping rate for 15 per second. The physical fitness index (PFI) score was calculated as follows:

PFI = Duration of exercise in seconds x 100

$$\frac{5.5 \times \text{pulse rate (1-1.30 minute after exercise)}}{100}$$

STATISTICS-

All the values are expressed in mean \pm SD. Significance of the difference was calculated by applying 'Z' test & 't' test. P value <0.05 is taken as significant⁸.

RESULTS AND DISCUSSION

Table No.1 : There was no significant difference in Anthropometrical parameters between study and control groups and also experimental & placebo group (p>0.05), But the mean score of PFI in study group was significantly higher than control (p<0.001).

Therefore we concluded that Athletes have better physical Fitness Index (PFI) when compared to non athletes, this is in agreement

with the studies of Das Gupta and De, 1991⁹, Chatterjee, Mitra 2001,¹⁰ which signifies higher aerobic and physical work capacity in athletes. There was no significant difference in the values of PFI in experimental & placebo group before and after antioxidant (Vitamin E) supplementation in them ($p > 0.05$).

The comparative values of PFI in experimental and placebo subjects before and after supplementation of respective drugs did not show any statistical significant difference ($p > 0.05$).

Our observation is in agreement with Peterson, et al¹¹, Jake man and Maxwell¹² in which there was no effect of vitamin E supplementation on serum CK after the race for 7 days and Lawrence et al¹³,

Weight, et al¹⁴ also found that antioxidant supplementation does not have any beneficial effect on increasing swimming endurance. Others have reported that supplementation of vitamin E & Co-enzyme Q10 for marathon runners for three weeks before race found no change in lipid peroxidation or CK response after race when compared with controls¹⁵.

Therefore in conclusion, our study supports the generally accepted view that antioxidant supplementation does not help in increasing endurance capacity of athletes but may help in reducing the markers of oxidative damage after exercise.

The prime role of antioxidants on cardiopulmonary efficiency in endurance athletes is yet to be answered.

REFERENCES

1. Sunil K R, Das, et al. Determination of physical fitness Index (PFI) with modified Harvard Step Test (HST) in young men and women. *Ind J Physiol & Allied Sci.*, 1993 Vol.47, No.2 p73-76.
2. Safrit M J. (1986) Introduction to measurement in physical education and exercise science. (Times Mirror Ed), Mosby College Publishing, p.250.

3. TATEISHI N, T HIGASHI, et al. Rat liver glutathione: possible role as a reservoir of cysteine. *J Nutr.* 107; 51: 1977.
4. Vina J, Gomez, Cabrera M C, Lloret A et al. Free radicals in exhaustive physical exercise: mechanism of production and protection by antioxidants. *IUBMB – Life.* 2000 Oct – Nov; 50(4-5): 271-7.
5. Chanden K Sen. Oxygen toxicity and antioxidants: State of the Art. *Ind J Physiol Pharmacol.* 1995; 39 (3): 177-196.
6. Sen C K. Antioxidants in exercise nutrition. *Sports-Med.* 2001; 31 (13): 891-908.
7. Neisner J S, Laurie J A. *Human Biology - A guide to field methods.* 2nd Edition, Oxford and Edinburgh; Blackwell Scientific Publications, 1969; 325-328.
8. Mahajan B K. (1991) *Methods in Biostatistics*, 5th Edition, Jaypee Publications P129-153.
9. P K Gupta & A K De. Assessment of cardiopulmonary efficiency in athletes and non-athletes, *Ind J Physiol Pharmacol* 1991; 35(4), 245-248.
10. S Chaterjee & Anirban Mitra. The relationship of physical fitness score with different morphological parameters and VO₂ max on adult female athletes and non-athletes. *Ind J Physiol and Allied Sci*; Vol 55, No1, 2001: p7-11.
11. Emil Wolsk Petersen, Kenneth Ostrowski, Tobias Ibfelt, Myriam Richelle, Elizabeth Offord, Bente Pedersen. Effect of vitamin supplementation on cytokine response and on muscle damage after strenuous exercise. *Am J Physiol –Cell Physiology.* 280(6): C1570.1575, June 2001. p1-12.
12. Jakeman P, Maxwells. Effect of antioxidant: Vitamin supplementation on muscle function after eccentric exercise. *Eur J Appl Physiol Occup Physiol* 1993; 67(5): 426-430.
13. Jeffrey D Lawrence, Richard C. Bower, Winston P. Riehl, Jack L. Smith. Effects of α -tocopherol acetate on swimming endurance of trained swimmers. *Am J Clin Nutr.* 28: 205-208, 1975.

14. Lindsay M Weight, Timothy D Noakes, Dimitri Labadarios, John Graves, et al. Vitamin and mineral status of trained athletes including the effects of supplementation. Am J Clin Nutr. 1988; 47: 186-91.
15. Kaikkonen J, Kosonen L, Nyysönen K. Effect of combined coenzyme Q10 and D-

a-tocopheryl acetate supplementation on exercise induced lipid peroxidation and muscular damage: a placebo-controlled double-blind study in marathon runners. Free Radic Res 1998; 29:85.

Table 1. various Physiological and PFI values in experimental & placebo group (before and after supplementation of vit.E) also in control and study group.

Parameters	Experimental group (n=19)	Placebo group (n=18)	Control (n=33)	Study (n=37)
Age(years)	18.21±0.04	18.27±0.44	18.12±0.32	18.22±0.41
Height (cms)	155.5±4.84	157.33±6.66	152.09±3.52	156.43±5.88
Weight(Kg)	50.63±5.45	52.44±5.97	50.60±2.85	51.78±6.20
BSA(square meters)	1.47±0.09	1.51±0.01	1.45±0.05	1.49±0.09
BMI (Kg/mts)	20.89±1.94	21.20±2.28	21.24±3.75	21.02±2.12
Body Fat %	14.08±2.205	13.86±1.46	13.10±1.59	13.64±2.70
Lean Body Mass	43.14±4.54	45.14±4.76	43.86±2.65	44.11±4.75
Physical Fitness Index(PFI)before supplementation	83.12±8.90	85.34±9.91	74.25±3.37 Not supplemented with vit.E	84.68±9.79 P<0.001***
PFI After supplementation	84.08±9.12	85.22±3.37 p>0.05	—	—

Values are expressed in mean±SD, p<0.001 is highly significant, p>0.05- not significant.