Research Paper

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Study of serum Ascorbic acid levels in short term and long term Yoga Practices

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Introduction

Health is defined as Physical, mental and social well being and not merely the absence of disease.1

In the last few decades the incidence of psychomotor and psychiatric illness has created an awareness regarding the mental and emotional well being as an important criterion of health. Scientific methods of modifying and improving the mental aspect of health were investigated and this led to a renewed interest in the ancient Indian system of "Yoga". 2

Intense physical activity in the form of strenuous exercise causes more oxygen consumption and more free radical production termed as oxidative stress, while in Yoga movements are done slowly and steadily which brings about physical and mental relaxation with minimum energy expenditure and less oxygen consumption. Thus it causes less oxidative stress.3

Oxidative stress is production of oxygen radicals in biological system. Antioxidants are compounds that block the production of these free radicals. Various types of exercise studies already have been done. It is observed that variable results are drawn from these studies.4,5

With current awareness about various health improvement measures,more study oriented research is required to give exact relationship between antioxidants in Yoga. The present study was designed to see the effect of "Yoga" on antioxidant status in young healthy individuals. Ascorbic acid (Vitamin C) levels are taken as an indicator of Antioxidant status.

Aims and objectives

To estimate Ascorbic acid (Vit .C) in short term and long term Yoga Practices

Materials and Methods-

The present study was undertaken in 32 male individuals aged between 20-35 yrs .Newly joining individuals for yogic training in the math in Narayan-Peth were selected. A proforma was made by which the subjects were selected after clinical examination which consisted of body weight, pulse, blood pressure, respiratory rate, body temp. Dietary history of each subject was taken at the time of first meeting.The diet of all the individuals was standardized and was instructed to follow same dietary pattern throughout the study period .It was confirmed that none of them had previous or current training in any type of exercise.

A study design was told to each subject and Informed written consent was taken from each individual Symptoms suggestive of disease of any body systems, Family h/o carcinoma ,Recent exposure to radiation ,Addictions such as tobacco, Gutkha, . alcohol ,Cigarette smoking etc were excluded from the study . Subjects who were joining Yoga center for one year and who were fulfilling all the criteria for selection were selected. It was confirmed that the persons were not doing any sort of strenuous exercise and not doing any heavy physical works during routine job.

Yogic training pattern-

Minimum duration for Yoga for 1 hour/day and 5 days/week. The subjects were doing Yoga in morning hours. The sessions used to begin with meditation and Pranayama.It included prarthana,dhyana and pranayama.Various asanas were performed and session ended with shavasanas.Each session lasted for about 40-60 minutes on an average. Asanas included were- Padmasana, Vajrasana, Garudasana, Bhujangasana, Dhanurasana, Shavasana etc.done under expert guidance of Yoga teachers.

Before yogic training,About 10 ml of blood was collected early morning hours without food, from anticubital vein with all aseptic precautions as control sample. Serum was prepared by centrifugation and it was used for estimation of Ascorbic acid (vit.C) second sample was taken at the end of 3 months of Yoga & third at the end of 6 months of yoga of the same individual. Serum Ascorbic acid (Vit. C) was estimated by Ayekaw (1978) method.(6)

Table no.1 Average Serum Ascorbic acid levels before and after Yogic training (mg/dl)

Sr. No.	Before Yoga (A) Mean+-S.D.	3 months after yogic training (B) Mean+-S.D.	6 months after yogic training (C) Mean+-S.D.	Difference between A & B	Difference between A & C
1	1.215+ 0.143	1.234+ 0.147	1.293+ 0.134	0.019	0.078**

There was no statistically significant difference in average serum Ascorbic acid values between before and after 3 months yogic training but there was statistically highly significant (P<0.001) difference in average serum Ascorbic acid values between before and after Yogic training.

DISCUSSION

A combination of scientifically based information and circumstantial evidence indicates that physical activity is beneficial to health in general with specific physiological gains in various systems and many biochemical variables. Physical activity is associated with beneficial changes in serum lipid but exhaustive exercise has been suggested to increase oxidative stress. Increased mental stress also increase oxidative stress. 7,8

Cells continuously produce free radicals and reactive oxygen species (ROS) as a part of metabolic processes. These free radicals are neutralized by an elaborate antioxidant defense system consisting of various antioxidant enzymes and antioxidant vitamins like Ascorbic acid (vit C) and α- tocopherol (vit E). Excess physical activity, increased mental stress and exercise can produce an imbalance between ROS and antioxidants, which is referred to as oxidative stress. 9

It is well known that free radicals are generated deliberately by animal cells in certain special circumstances as these are beneficial as bactericidal agents. Also free radical chain reaction takes place in our body countless times a day. Cigarette smoking, alcohol consumption, pollutants, sunlight, radiations, emotional stress, mental stress, excess physical activity, and fast food all these can cause free radical formation and free radical chain reactions.

Most other factors influencing free radical production were ruled out and the present study was planned to study the effect of Yoga on the production of free radicals. Yoga ,the ancient system consists of static postures and breathing control.It has slow body movements less oxygen consumption and hence less oxidative stress.10.11,12

Ascorbic acid (Vit C) levels were estimated as an indicator of

antioxidant status.It is water soluble vitamin present in Citrus fruits.Body has its store in various fluid. The serum values were estimated before, 3 months after and 6 months after training in both groups.

Table 1 shows the serum Ascorbic acid levels in individuals before, 3 months after Yogic training and 6 months after Yogic training. The values range from 1 — 1.625 mg/d Ascorbic acid is present in both extra and intracellular fluid. It prevents certain unwanted oxidative reactions initiated by oxygen and thus acts as reactive oxygen species scavenger.

Thus, Yogic training found to be beneficial in increasing body's antioxidant status due to its relaxation techniques. The modern living lifestyle is known to produce various physical and psychological stresses and subject the individual to produce oxidative stress. Yoga is a psychophysical and spiritual science which causes physical and mental relaxation. Thus it causes relief from oxidative stress.13,14,15

As oxidative stress was decreased than the previous oxidative stress before yoga highly significant utilization of antioxidants stress in the form of enzymes as well as vitamins was decreased. Thus antioxidants were spared leading to increased Ascorbic acid levels ($p<0.00l$).After 3 months of Yogic training there was no significant increase in Ascorbic acid levels thus probably Ascorbic acid was utilized to combat oxidative stress.

Also there was increased antioxidant enzymes like superoxide dismutase, catalase, glutathione peroxidase etc. Yoga resulted in decreased heart rate; decreased blood pressure decreased oxygen demand by tissues. All these spared antioxidant vitamins like Ascorbic acid. Also Ascorbic acid levels raised as a physiological response. All these factors must have contributed in improving the antioxidant status after Yogic training. (16),(17)

Antioxidant status in the form of significant increase in serum Ascorbic acid levels did not occur. Thus body's antioxidants must have used up. After 6 months of Yogic training oxidative stress is decreased in highly significant levels and antioxidant status was also improved in highly significant amount.

Both these parameters were also studied in aerobic strenuous exercise group. As already stated physical activity is associated with beneficial changes in lipids and many other factors but exhaustive exercise has been suggested to increase oxidative stress. Initial suggestions that free radical processes such as lipid peroxidation were elevated during exercise came from studies of whole body exercise in man and rats. These were rapidly followed by studies of products of free radical reactions within the tissues of exercising animals. All these studies inferred that due to exercise induced damage to skeletal muscle, free radical generation increased.(l, 4)

These results could be the manifestations of body and mind relaxation by yoga.it is proven fact that Yoga is science of holistic living and not merely a set of Asanas and Pranayama. It is psychological and spiritual science ,which aims at the harmonious development of human body,mind and soul.Yoga physical postures and breathing exercises improve muscle strength,flexibility,blood circulation and oxygen uptake.The relaxation induced by meditation help to stabilize the autonomic nervous system with a tendancy towards parasympathetic dominance.i.e.decreased heart rate,decreased blood pressure and hence decreased tissue demand of oxygen.(18),(19),(20)

In Yoga oxygen consumption decreased as person is adjusted to all meditation techniques as the person relaxed by Yogic training the mental or emotional stress is reduced.Thus as a stress relaxation technique it must have contributed in decreased free radical generation.

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