

A Comparative Study Of Antioxidant Status In Yoga And Normal Adult Males.

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Abstract: Background & Objectives: Yoga practice reduces psychological stress and improves antioxidant level by decreasing sympathetic activity and oxidative stress. To counteract harmful effects of reactive oxygen species, the body produces various antioxidant enzymes. As reports are scanty regarding this topic, the study is designed to appraise the role of yoga in maintaining antioxidant status. **Method:** The study was conducted on fifty adult males (age-25-40 yrs) who were divided into two groups—a yoga (n=25) and a control (n=25). The yoga group was trained in yoga for 6 months. The yoga schedule consist of prayers, asanas, pranayama and meditation. The control group was not involved in any type of physical exercise. Blood samples were collected in fasting condition of both groups. Superoxide dismutase and glutathione reductase levels were estimated spectrophotometrically. **Results:** There was statistically significant increase in levels of superoxide dismutase and glutathione reductase in yoga group as compared to control. **Interpretation & Conclusion:** Yoga improves the antioxidant levels. Yoga has therapeutic, preventive and protective effects by decreasing oxidative stress. The clinical relevance is that yoga practice can be used to maintain the antioxidant defense system under stressful conditions.

Keywords: Antioxidant status, glutathione reductase, superoxide dismutase, Yoga.

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Introduction: In this modern era stress has become an integral part of human life. It is vital that stress is kept under control and normal functioning is not hampered due to excessive stress. Stress is considered to be any condition which results in perturbation of the body's homeostasis. If the level of stress is extreme, the homeostatic mechanisms of the organism become deficit and the survival of the organism is threatened¹.

Ancient Indian Culture has perceived and promoted merits of yogic practices. Regular practices of Yoga brings about decrease in stress level and improve antioxidant status². Antioxidants are group of chemical compounds that can deactivate free radicals and prevent their formation.

Reactive oxygen species are derived from normal physiological and metabolic processes that are produced in the course of oxygen metabolism³. These reactive oxygen species or free radicals are mainly responsible for oxygen toxicity. To continue the existence in adverse ambience, the living organisms produce variety of antioxidant enzymes viz, superoxide dismutase, glutathione reductase etc.

They also stimulate immune system to increase our protection against all diseases. Low antioxidant status in body causes increased risk

of heart diseases, cancer, arthritis, cataract and aging. Living organisms generate a number of antioxidants like superoxide dismutase, glutathione reductase, glutathione peroxidase etc. whose key objective to seize and inactivate the generated reactive oxygen species⁴.

Yoga decreases sympathetic activity and oxidative stress⁵. Various reports regarding aerobic exercise training showed increased catalase activity but this is not sufficient to maintain radox status of the body². There is growing evidence that supports the beneficial effects of yoga on antioxidant enzymes. However the reports are scanty regarding whether yoga training can improve antioxidant level. Hence this study is designed to appraise the role of yoga in maintaining antioxidant status.

Material & Method: The present observational study was carried out in fifty healthy adult males of age group between (25-40 yrs) at Pragati Pathological Laboratory in Ambejogai. The study was approved by institutional ethical committee prior to commencement of the study.

Cases and controls were selected as per following criteria. Cases-25 adult males involved in yoga training more than 6 months. The yoga group underwent the following programme for an hour per day **in the morning session**.

- a) Prayer-1min.
- b) Sthithpragnyasana - 2min.
- c) Asanas-25min.
- d) Anuloma,Ujjayi,Bhramari-5min.
- e) Yognidra with visualization-20min
- f) Meditation on Onkar & Tratak-5min.
- g) Prayer &Sthithpragnyasana-2min.

Controls-25 adult males, not involved in any type of physical exercise.

Physical examination of all the subjects before the start of procedure was done. Those who were suffering from cardiovascular and pulmonary diseases were excluded.

The procedures were followed in accordance with the ethical standards of the committee on human experimentation of the institution in which the experiments were done.

Procedure- Fasting blood samples were collected in both groups and analysed for Superoxide dismutase (SOD) and Glutathione reductase (GR) levels.

Superoxide dismutase (SOD) levels were determined by Marklund S, Marklund G method⁶. SOD levels were measured by its ability to inhibit pyrogallol autoxidation. For this the Dietylenetriaminepentaaceticacid treated whole blood was treated with pyrogallol air-equilibrated Tris-cacodylic acid buffer.The inhibition of autoxidation of pyrogallol was measured spectrophotometrically as a determinant of SOD activity.

To measure Glutathione reductase (GR) activity, whole blood was taken in an EDTA (Ethylenediaminetetraceticacid) treated vial and 10% lysate of whole blood was prepared to measure the ac Glutathione reductase activity spectrophotometrically by the method of Racker⁷.

Enzyme study has not done before and after yoga. We compared enzyme levels in between yoga and non-yoga groups.

Results: Comparison of SOD and GR levels between Yoga and Normal adult males

Enzymes	Yoga Group (Mean ± S.D.)	Non-Yoga Group (Mean ± S.D.)	'p' value	Significance
SOD(U/ml)	4.89+0 .60	2.08+0 .46	P<0.0 01	Significant
GR(mmol/m l/min)	0.82+0 .04	0.91+0 .04	P<0.0 01	Significant

There was statistically significant increase in the levels of Superoxidedismutase (SOD) and glutathione reductase (GR) levels in yoga group as compared to non-yoga group by applying Unpaired "t" test.

Discussion: Stress is a silent killer of modern era which needs to be handled. In this modern era of high-technology and fast life-style people are indulging in different kinds of stress which disturb the harmony of mind and consequently the body.

Stress increases catecholamines in the body by stimulation of sympathetic activity which affects the cell metabolism to such a degree those cytotoxic free radicals are formed that lead to disease progression⁸. To counteract their harmful effects, the body produces various anti-oxidant enzymes viz. superoxide dismutase, glutathione reductase etc.

Literature reviews showed that different exercises enhance antioxidant enzymes. Yogic asanas and Pranayama reduces sympathetic activity by shifting autonomic balance towards parasympathetic activity. Pranayama is documented to produce intense calming effect on mind and relieve psychological stress⁵.

The present study revealed a definite increase in Superoxide dismutase levels in yoga as compared to non-yoga group. Superoxide dismutase protects aerobic organisms against the potential deleterious effects of free radical i.e. Superoxide anion (O_2^-)⁹. Bhattacharya S, Pandey US and Verma NS showed increase in Superoxide levels with yogic breathing¹⁰.

Among anti-oxidant enzymes Glutathione reductase (GR) is a primary enzyme for maintaining glutathione redox status². It converts

oxidized glutathione(GSSG) to its reduced state(GSH) ². Evelo CTA, Palmen NGM, Artur Y explained more utilization of glutathione reductase after exercise, yoga and meditation¹¹. Our study also showed same results. Here in the yoga group glutathione reductase levels are significantly decreased as compared to control group.

Hence our study showed that there is improved antioxidant status in yoga as compared to control group.

Conclusion: According to our study ,We conclude that yoga may up regulate antioxidant capacity of cells to combat oxidative stress. Yoga can be used as a components of strategy to promote healthy life-style in vulnerable populations in order to prevent stress related diseases and ageing.

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