



## EFFECT OF YOGA IN MAINTAINING ANTIOXIDANT LEVELS IN ADULT MALES- A PREGMATIC ANALYSIS

**Dr. Hemlata Gupta**

Assistant Professor, Department of Physiology, Lakhiram Agrawal Medical College, Raigarh, Chhattisgarh

**Dr. Ram Krishna Gupta\***

Associate Professor, Department of Plastic Surgery, Cancer Hospital and Research Institute, Gwalior, M.P. \*Corresponding Author

**ABSTRACT** **BACKGROUND:** Our bodies have natural antioxidant defence systems that combat oxidative stress. Yoga increases these natural antioxidants in the body, including higher levels of the protein glutathione and an enzyme called glutathione peroxidase.

**OBJECTIVE:** to appraise the effect of yoga in maintaining antioxidant .

**MATERIAL & METHODS:** The study was conducted on hundred adult males (age-25-40 yrs) who were divided into two groups; case (n=50) and control (n=50). The yoga group was trained 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:** Significant increase in levels of superoxide dismutase and glutathione reductase in yoga group was seen as compared to control. Glutathione levels went up for both the yoga and regular exercise groups, but much more so in the yoga group.

**CONCLUSION:** We concluded that yoga training can improve antioxidant levels. It can be used as a component of strategy to promote healthy life-style in vulnerable populations in order to prevent stress related diseases and ageing.

**KEYWORDS :** Yoga, Antioxidant, glutathione reductase, superoxide dismutase.

### INTRODUCTION-

Stress is any change in the environment that requires body to react and adjust in response. The body reacts to these changes with physical, mental, and emotional responses. 43% of all adults suffer adverse health effects from stress. 75% to 90% of all doctor's office visits are for stress related ailments and complaints. Stress can play a part in problems such as headaches, high blood pressure, heart problems, diabetes, skin conditions, asthma, arthritis, depression, and anxiety.<sup>1</sup> Ancient Indian Culture has perceived and promoted merits of yogic practices.<sup>2</sup> They help in relieving the physical as well as the psychological negative effects of the problem by ensuring a healthy and productive response to the stress stimuli. Reactive oxygen species are derived from normal physiological and metabolic processes that are produced in the course of oxygen metabolism<sup>3</sup>. Eating foods rich in antioxidants like certain beans, nuts, fruits, and vegetables and even chocolate, has been linked to better memory and heart health. Now yoga has also been known as natural antioxidant boosters.<sup>4</sup> Yoga 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 several antioxidants like superoxide dismutase, glutathione reductase, glutathione peroxidase etc. whose key objective to seize and inactivate the generated reactive oxygen species<sup>5</sup>. As Chronic stress increases sympathetic discharge for a longer time and is characterised by a change in the set point of hypothalamo-pituitary axis activity, leading to immediate effect on heart rate, blood pressure, temperature, respiratory rate, catecholamines and corticosteroids. Thus sympathetic overactivity for a longer time is associated with cardiovascular morbidity and mortality. Yoga decreases sympathetic activity and oxidative stress<sup>6</sup>. 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 study was carried out on 50 healthy adult males volunteers of age group between (25-40 yrs) at LAMC OPD of Medicine , who were divided into two groups:

- control (no yoga intervention, n=50)
- case (yoga, n=50)

Cases and controls were selected as per criteria. The study was approved by institutional ethical committee prior to commencement of the study.

The study involves Yoga practice with an instructor for more than 6 months with recommendations to practice daily at home in the morning session for 40 minutes with the help of a DVD. The yoga

program consisted of yoga body poses (asanas), exercises involving awareness, voluntary regulation of breath (pranayama), and meditational practices. Physical examination of all the subjects before the start of procedure was done. Those who were suffering from cardiovascular and pulmonary diseases were excluded.

Superoxide dismutase (SOD) levels were determined by Marklund S, Marklund G method. 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.<sup>7</sup>

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 Racker.<sup>8</sup>

**Statistical Analysis-** The recorded observation were studied in Epi-info software for analysis. Unpaired Student's t test was used to test the significance. P<0.05 is considered statistically significant.

### RESULTS AND OBSERVATIONS-

**Table 1- Comparson 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)	4.99+0.65	2.18+0.49	P<0.001	Significant
GR(mmol/ml/min)	0.89+0.14	0.87+0.24	P<0.001	Significant

There was statistically significant increase in the levels of Superoxide-dismutase and glutathione reductase levels in yoga group as compared to non-yoga group.

### DISCUSSION-

Nowadays, stress is a common problem in modern life which 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 progression. To counteract their harmful effects, the body produces various anti-oxidant like glutathione, coenzyme Q10, lipoic acid, flavonoids, phenols, polyphenols, and phytoestrogens.

Various techniques in yoga have been documented to help in stress management. These techniques work at an individual level and

also at a collective level to ensure that there is significant respite from the condition of extreme stress. Yogic asanas and Pranayama reduces sympathetic activity by shifting autonomic balance towards parasympathetic activity.

The present study showed an 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<sub>2</sub><sup>-</sup>). Bute Smita S, Bhattacharya S, Pandey US and Verma NS also showed increase in Superoxide levels with yogic breathing.<sup>9</sup>

Among anti-oxidant enzymes Glutathione reductase is a primary enzyme for maintaining glutathione redox status. It converts oxidized glutathione to its reduced state. Bute Smita S\*, Evelo CTA, Palmen NGM, Artur Y explained more utilization of glutathione reductase after exercise, yoga and meditation.<sup>10</sup> 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-

Our study concluded, regular yoga practice remarkably attenuated oxidative stress and improved antioxidant levels of the body. Moreover, yoga beneficially affected stress hormone releases as well as partially improved immune function.

**Conflict of Interest-** None declared.

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A Study on the Effect of Yoga on Sympathetic Nervous System Athokpam Mirabai 1, Tyngshainlang Sutnga2, Ningthoujam Sarada3 1 (Visiting lecturer, College of Nursing, Medical Directorate, Manipur, India) 2 (Post graduate student, Department of Physiology, Regional Institute of Medical Sciences, Imphal, India) 3 (Professor, Department of Physiology, Regional Institute of Medical Sciences, Imphal, India)
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