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Research Article

EFFECT OF SAHAJA YOGA ON MDA AND BLOOD THIOL LEVELS IN HEALTHY VOLUNTEERS

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ABSTRACT
Sahaja Yoga is a unique method of meditation based on an experience called Self Realization (Kundalini awakening) and aims at achieving holistic health care for people. A study was designed to assess the effect of Sahaja Yoga meditation on plasma MDA levels and blood thiol levels in healthy volunteers (n=100) and was compared with a group of normal healthy controls (n=100). The experimental group was further subdivided into two groups, i.e. as group A (in the age group of 20-35 years) and group B (age 36-50 years) with equal participants in each group. Blood samples were taken before starting the yoga (baseline) and after 40 and 90 days. Plasma malonyldialdehyde (MDA) level was found to be significantly reduced ($p < 0.001$) and blood thiol level was raised significantly ($p < 0.001$) after 40 days. Similarly, the changes in the both parameters were highly significant even after 90 days. Reduction in oxidative stress suggests that Sahaja Yoga can be used as a complimentary therapy in the management of cardiovascular diseases, diabetes and stress related disorders.

Keywords: *MDA, Blood Thiol, Sahaj Yoga Meditation, Lipid Peroxidation, Oxidative Stress*

INTRODUCTION
Sahaja Yoga is a special kind of meditation with a wide range of subtle effects on the body, and has been practiced worldwide since 1970. It is assuming importance in improving mental health and quality of life in the treatment of a number of psychiatric and psychosomatic disorders. The meditative experience in Sahaja Yoga is characterized by the feeling of a complete mental silence along with a state of complete mental alertness leading to a sensation of positive mood, benevolence and relaxation (Manocha *et al.*, 2002). Study on the effects of yoga on cognitive functions has shown improvement in memory, vigilance & anxiety (Mohan *et al.*, Kabat *et al.*, 1992). Sahaj Yoga has shown beneficial effect in the management of hypertension, bronchial asthma (Chugh, 1987) and epilepsy (Panjwani *et al.*, 1995). Scientific studies on Sahaj Yoga have also demonstrated its role in reduction in anxiety levels (Batra, 1999), improvement in sensory-motor functioning, reaction time (Ravi, 1998) and better autonomic control (Rai *et al.*, 1998) in healthy practitioners. However, biochemical parameters have not been studied yet and there is paucity of data of the effects of Sahaj Yoga on oxidative stress which can be asses by serum MDA levels and blood thiol levels. Therefore the alternative approaches i.e. Sahaj Yoga with potential cognitive enhancement effects, if any, have been explored in this study.

MATERIALS AND METHODS
This study was conducted in 200 healthy male volunteers, in the age group of 20 to 50 years, in Department of Biochemistry, Maharaja Agrasen Medical College (M.A.M.C), Agroha, Hisar. Two hundred healthy male volunteers were divided into two groups as given below:
Group-I –which included 100 volunteers as control subjects who led their normal life without doing any yoga, meditation or exercise (n=100).
Gropp-II-which included 100 volunteers who started practicing Sahaja Yoga (meditation). Expert Sahaja yogis conducted the Sahaja Yoga session continuously for five days for 45 minutes on each day, and then once every week for follow up and compliance. The weekly sessions involved meditation, instructional Videos, personalized instruction, and discussion of problems in relation to improving the experience of meditation.

Each group was further sub-divided into two categories, according to their age-
Sub- group 'A': 50 volunteers having age in the range of 20 to 35 years.
Sub- group 'B': 50 volunteers having age in the range of 36 to 50 years.
For comparison, the subjects of the two age groups were put together in group C, which included all the 100 volunteers in the range of 20 to 50 years of age. . The project was reviewed and approved by the Institutional Ethics Committee.
All subjects were explained about the study undertaken and informed written consent was obtained. These subjects were given a questionnaire and personal data form, which they were required to fill up with certain details like their dietary habits, extent of physical activity and family history. Subjects were asked to avoid food, tea, coffee, nicotine at least two hour prior to testing. The whole procedure was explained in detail to each subject in order to alley any fear or apprehension. The basic parameters like age, weight and height were measured and recorded in specific proforma attached.

Exclusion Criteria

Subjects having previous experience of yoga or sports training and suffering from any acute or chronic disease, chronic smoker, chronic alcoholics and subjects taking any vitamin or anabolic supplement were excluded.

Biochemical Parameters Studied

Firstly, a baseline fasting venous blood sample (approx. 7 ml) was collected from all subjects before starting the sahaja yoga under the study. After starting the sahaja yoga, two more samples were collected after 40 days and 90 days. The volunteers were assessed for MDA and blood thiol levels

Malonyldialdehyde (MDA)- was estimated by Buege's method. In this method, the product of lipid peroxidation i.e. MDA reacts with thiobarbituric acid (TBA) to give a red chromogen, the absorbance of which is read at 535 nm (Kumar *et al.*, 1995).

Total Thiols- was estimated by Ellman's method, in this method, 5-5 dithiobis-2-nitrobenzoic acid reacts with total sulphydryl groups to form a chromogen whose extinction is measured at 420 nm (Ellman, 1959).

Statistical Analysis

The data was recorded; mean and standard deviation were calculated for each group. Results were statistically analyzed by Student's t- test. Paired't' test was used for inter group comparisons. Analysis of variance was done to see if the group differs in any of the parameters. The interpretation of 'P' values was as follows:
P>0.05 - not significant, P<0.05 – Significant <0.01 - Highly significant, P<.001 – Very highly significant.

RESULTS AND DISCUSSION

Data is depicted in Table 1 and Table 2. Both parameters were comparable in control subjects and subjects practicing sahaja yoga of each age group.

Table 1: Comparison of Plasma malondialdehyde (MDA) concentration (mmol/L) in controls and subjects practicing sahaja yoga (Mean± SD)

	Control subjects			Subjects practicing sahaja yoga		
Groups	**Baseline**	**After 40 days**	**After 90days**	**Baseline**	**After 40 days**	**After 90days**
G-A	2.999 ± 0.115	2.997 ± 0.128	3.005 ± 0.131	3.009 ± 0.105	2.933 ± 0.107	2.913 ± 0.106
G- B	3.085 ± 0.112	3.085 ± 0.127	3.099 ± 0.133	3.119 ± 0.126	3.024 ± 0.127	3.012 ± 0.123
G-C	3.042 ± 0.121	3.041 ± 0.135	3.052 ± 0.140	3.064 ± 0.128	2.979 ± 0.125	2.962 ± 0.125

Table 2: Comparison of Total blood thiols concentration (mmol/L) in controls and subjects practicing sahaja yoga (Mean ± SD)

Groups	Control subjects			Subjects practicing sahaja yoga		
	Baseline	After 40 days	After 90days	Baseline	After 40 days	After 90days
G-A	3.989 ± 0.166	3.990 ± 0.165	3.986 ± 0.176	3.963 ± 0.176	3.986 ± 0.176	3.991 ± 0.162
G- B	4.001 ± 0.177	3.999 ± 0.178	4.006 ± 0.182	3.990 ± 0.165	4.016 ± 0.172	4.024 ± 0.192
G-C	3.995 ± 0.171	3.995 ± 0.171	3.996 ± 0.178	3.976 ± 0.170	4.001 ± 0.174	4.007 ± 0.178

When compare of plasma malondialdehyde (MDA) concentration and Total blood thiols concentration in both Groups; A vs B subjects practicing sahaja yoga there were no significant change was observed.

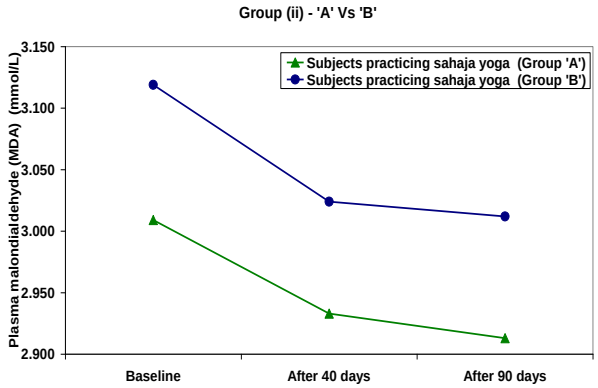

Figure 1: Comparison of Plasma malondialdehyde (MDA) concentration in both Groups A vs B subjects practicing sahaja yoga

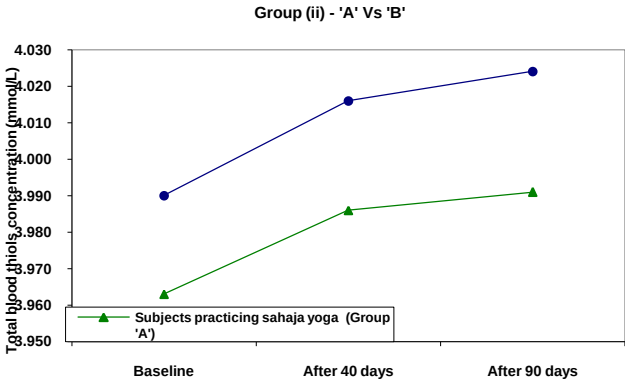

Figure 2: Comparison of Total blood thiols concentration in both Groups A vs B subjects practicing sahaja yoga

In present study mean plasma MDA concentration in control subjects in age Group A (20-35 years) was changed statistically insignificant on day 90. In subjects practicing Sahaja Yoga, age Group A (20-35 years) the mean baseline plasma MDA concentration was decreased significantly on day 40 as well as on day 90 of practicing Sahaja Yoga. The change in the mean baseline MDA concentration in control subjects of age Group B (36-50 years) after the follow-up period of 90 days was not statistically significant. In subjects practicing Sahaja Yoga, age Group B (36-50 years) the mean baseline MDA concentration was significantly decreased on day 40 and on day 90 of practicing sahaja Yoga. The change in the mean baseline MDA concentration in control subjects of age Group C (20-50 years) after the follow-up period of 90 days was not statistically significant. In all the subjects practicing sahaja yoga, age Group C (20-50 years) the mean baseline MDA concentration was significantly decreased on day 40 and on day 90 of practicing Sahaja Yoga.

The change in the mean total blood thiols concentration in control subjects of age Group A (20-35 years) after the follow-up period of 90 days was not statistically significant. In subjects practicing Sahaja Yoga, age Group A (20-35years) the mean baseline total blood thiols concentration was increased on day 40 and on day 90.The change in the mean baseline total blood thiols concentration in control subjects of age Group B (36-50 years) after the follow-up period of 90 days was not statistically significant. In subjects practicing Sahaja Yoga, age Group B (36-50 years) the mean baseline total blood thiols concentration was significantly increased to on day 40 and on day 90.The change in the mean baseline total blood thiols

concentration in all the control subjects of age Group C (20-50 years) after the follow-up period of 90 days was not statistically significant. In all the subjects practicing Sahaja Yoga, age Group C (20-50 years) the mean baseline total blood thiols concentration was significantly increased on day 40 and on day 90.

Discussion

Sahaja Yoga is a form of "Kundalini Yoga" which describes a simple technique to arouse the latent potential of man by a simple meditative process. The science focuses on awakening the dormant primordial energy (the *Kundalini*), whereby a flow of subtle cool cosmic vibrations in the body is achieved which nourishes and rejuvenates each and every cell of the body. In present study we observed that subjects practicing Sahaja Yoga have shown a significant reduction in serum MDA concentration and a concomitant rise in total blood thiols level up to 90 days. However, the differences were nearly same in the two age groups. To our surprise, we have not come across any study from literature, depicting the effect of sahaja yoga on various biochemical parameters. Sudsuang *et al.,* (1991) have shown that practising Dhammakaya Buddhist meditation produces certain biochemical and physiological changes and reduces the reaction time (the interval time between the presentation of a stimulus and the initiation of the muscular response to that stimulus).

They reported a significant increase in serum total protein and reduction in serum cortisol levels in male subjects of age 20-25 years. Vyas *et al.,* (2008) observed that Raja Yoga meditation lowers serum cholesterol and LDL-C concentrations in post- menopausal women. Vandana *et al.,* (2011) studied the impact of integrated Amrita Meditation Technique (IAMT) on adrenaline and cortisol levels in healthy college students (age 18-21 years). They reported that IAMT has long-term efficacy in reducing the levels of these two stress hormones, within group comparisons, *i.e.*, before the start of IMAT and during the follow up period up to 8 months.

Meditation techniques such as Sahaja Yoga have been suggested to have a deep impact on the autonomic nervous system including activation of parasympathetic response (Manocha, 2000). Meditation is also believed to gradually diminish sympathetic dominance, resulting in a better balance between the sympathetic and parasympathetic (Anand, 1991). It also brings about a hypo-metabolic state (Young and Taylor, 1998). By modifying the state of anxiety, meditation reduces stress induced sympathetic over activity (Anand, 1991).

Perez *et al*., (2005) reported that metabolic effects of meditation include a decreased adrenocortical activity and long term decreased cortisol and thyroid stimulating hormone secretions. This hormonal imbalance in turn may also affect glucose homeostasis and alter lipid profile. Oxidative stress refers to a serious imbalance between oxidant production and anti-oxidant defenses, resulting in oxidative damage of target macromolecules such as DNA, protein and lipid structures (Halliwell, 1994). By products of oxidation reaction are regularly measured as indicators of oxidative stress since free radicals themselves are unstable because of their high reactivity and short half life. Investigation of lipid peroxidation is the oldest determination of oxidative stress. Malondialdehyde (MDA) is extensively detected as parameter of lipid peroxidation (Valko, 2007). The antioxidant system is composed of antioxidant enzymes as well as endogenous non-enzyme antioxidants.

The most important endogenous antioxidant (non-enzyme) is whole blood total thiols (sulfhydryrls, which include-glutathione, homocysteine, cysteine and cysteinyl- glycine). These are the powerful reducing agents capable of acting as antioxidant in vivo. Reduced level of plasma MDA with increase total blood thiols were observed in subjects practicing Sahaja Yoga, in the present study. Alterations in MDA levels are in accordance with the studies of Maini, who also found a significant decrease in MDA levels in subjects practicing Sahaja Yoga (Maini, 2000). Kim *et al*., (2005) studied the effect of Zen Meditation on serum nitric oxide activity and lipid peroxidation, and reported a significantly higher level of serum nitrate+nitrite concentration and a reduced level of serum MDA than the control group. From these observations, it can be suggested that meditation leads to a decrease in oxidative stress, which in turn reduces lipid peroxidation and increases total blood thiols.

Conclusion

The findings conclude that Sahaja Yoga had enhanced the antioxidant defense mechanism in healthy individual by reducing oxidative stress.

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