



Influence of Yoga on Audiovisual Reaction Time of Medical Students

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ABSTRACT

Aim: The present study is to assess the alteration in auditory and visual reaction time, which is an index of central nervous system processing, among medical students.

Materials and Methods: Eighty healthy volunteers were selected and segregated into two groups, forty experimental group practicing yoga 12 weeks and forty as control group and their auditory and visual reaction time were assessed using simple auditory and visual reaction time instrument at Vinayaka missions homoeopathic Medical college, Salem, India.

Results and Conclusions: Results suggest that the group practicing Yoga had significant change in auditory and visual reaction time in comparison to the control group. These results may be due to personality development, better attention and concentration achieved due to Yoga training.

Keywords: Yoga, Auditory and visual reaction time, attention, concentration.

INTRODUCTION

Yoga and Pranayama are ancient sciences which originated in India, which can be practised to combat stress^[1] Yoga is philosophy & discipline applied to development of mind, body & spirit. Maharshi Patanjali, the father of yoga & great physician himself defines Yoga as “Complete mastery on mind & emotions”^[2]. The technique involves an active attentional or mindfulness component but its potential benefits have not been thoroughly explored. Despite an increase in interest pertaining to the health benefits of yoga practice, research focusing on the relationship between yoga practice and cognition is limited^[3]. Yoga can prevent memory lapses by calming you and enhancing your concentration. It can also improve your powers of recall by increasing circulation to your brain”^[4].

Reaction time is defined as interval of time between presentation of stimulus and appearance of appropriate voluntary response in subject. Reaction time has physiological significance and is a simple and non - invasive test for peripheral as well as central neural structures^[5]. Reaction time measurement is an indirect index of processing capability of central nervous system. Reaction time measurement helps in determining sensory motor association and performance of an individual^[6]. It is an index of cortical arousal and decrease in it indicates an improved sensory-motor performance and an enhanced processing ability of the central nervous system^[7]. Studies have demonstrated that subjects trained in yoga and pranayam can achieve a state of deep psychosomatic relaxation (un-disturbability)^[8]. This study is to find out whether short duration yoga has impact on sensory motor association and

performance of individual in terms of audio-visual reaction time.

Many people are doing yoga daily and reporting feeling its positive effects in their daily activities. Claims that yoga and meditation increase memory and recollection are common^[9]. The effect of yogic exercises on the mind is said to have immediate effects. Kocher (1979) used both meaningful words and nonsense syllables to test immediate (short-term) verbal memory abilities before and after a one-month period of yoga training for college-aged males and females. The results, though incomplete, suggested that yoga did facilitate immediate memory performance more than the absence of yoga^[13].

MATERIALS AND METHODS

We selected eighty healthy medical the age group of [18-23] years from Annapoorana Medical College and Vinayaka missions homoeopathic medical Salem, We excluded volunteers who had practised yoga in the past one-year and those with current or previous mental or neurological diseases, psychiatric, cardiovascular, respiratory or systemic illness, smokers, and alcoholics. We included only those who gave their written informed consents to participate in the study. The study was conducted in the Department of Physiology, Vinayaka mission homoeopathic medical College, Tamilnadu, India. Yoga training was shared daily six days for 30 minutes in the morning for 12 weeks. Study was commenced after obtaining approval from the institute's scientific advisory committee and human ethics committee. Auditory and Visual reaction time was recorded by using an in house build add on device called PC 1000. It is 1000 hertz square wave oscillator which has a soft key for start and stop function. PC 1000 Reaction timer instrument has two components (A & B) connected to each other. (A) has a start button and it is handled by the examiner only. (B) has a stop button which will be handled by the subject alone, it has a small Red light used as a stimulus to measure visual reaction time and head phone (1000 hertz's tone) which

receives the high pitch sound to measure auditory reaction time. Red light is selected for the experiment as it persists for a long time in retina. Component A and B is in turn connected to a personal computer which has audacity software installed in it. Audacity software records the reaction time in 0.001sec accuracy in wave format. The readings were taken between 2 pm -4 pm in a silent room. Instrument was kept on table & subject was made to sit down comfortably on chair. Practice was taken from each subject until they have understood and performed the task as required. Subject was asked to press & immediately release the switch with the thumb of right-hand as soon as he saw the glow of red light or hearing sound Minimum three trials are given for both VRT and ART measurement. Three readings are recorded and average of this is calculated as final VRT and ART. Readings of VRT & ART were taken before & after yoga training. Yoga training was given to only experimental group daily six days a week for 12 weeks. It consists of Surya namaskar, Padmasana, Paschimottanasana, Padahasthasana, Sarvangasana, Bhujangasana, Vajrasana, Tree stand pose, super brain yoga, Savasana for 30 minutes. The data was statistically analysed

RESULTS

Results suggest that the group practicing Yoga had significant change in auditory and visual reaction time in comparison to the control group. These results may be due to personality development, better attention and concentration achieved due to Yoga training

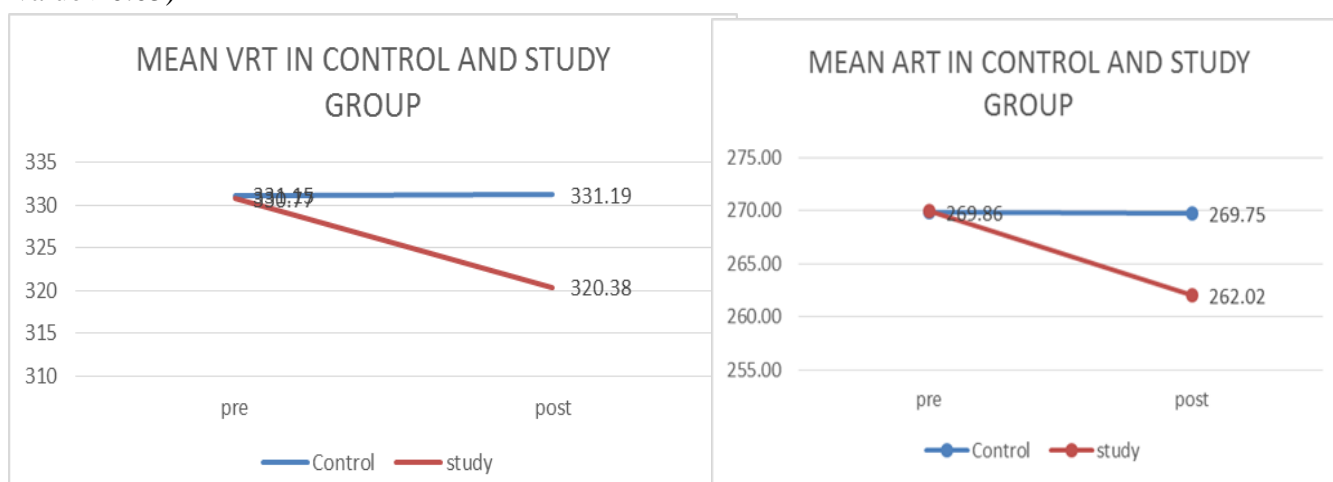
PRE AND POST STUDY OF VRT AND ART IN STUDY AND CONTROL GROUP

		Control group		Study group	
		Pre study	Post study	Pre study	Post study
VRT	Mean	331.15	331.19	330.77	320.38
	SD	2.749	2.701	37.28	23.90
ART	Mean	269.86	269.75	269.93	262.02
	SD	14.17	14.04	14.17	10.90
T		2.40262503		4.972992909	
P value		0.474123096>0.05 (NS)		6.81895E-06<0.001 (S)	

VRT-Visual reaction time, ART- Auditory reaction time

NS- Not significant, S- Significant

This study shows that the subjects practicing yoga for 12 weeks has significantly decrease in ART and VRT where the (P value is <0.001) ,Whereas the corresponding change in control group was not significant (P value >0.05)



The graph shows the difference in the mean of pre and post study group (yoga), and pre and post control group (without yoga). From the averages in Control data there is no difference found but in study data ART measure is decreased by more than 10 units after yoga. Similarly VRT decreases by 7 units

DISCUSSION

Present study is done to observe effect of yoga on concentration and memory power of medical students in terms of reaction time. One common claim is that yoga helps to clear the mind and this may have an effect on the ability to attend to relevant stimuli and recall information subsequently^[9]. The practice of yoga emphasizes body awareness and involves focusing one’s attention on breathing or specific muscles or parts of body; therefore it is possible that yoga may improve more general attentional abilities. Attentional focus is a major aspect of yoga practice. It produces similar effects as relaxation in that it tends to promote self-control, attention

and concentration, self-efficacy, body awareness and stress reduction^[10]. Simple reaction time is indirect index of processing capability of CNS & also simple means of determining sensory motor performance. Yoga has also been described as training in awareness which produces definite changes in perception, attention and cognition^[11]. It has been shown that processing of sensory information at the thalamic level is facilitated during the practice of yoga and meditation. Integrated approach of yoga that combines physical postures, pranayama and meditation together with the notional correction based on philosophy of yoga was found to improve both cognitive (visual perception) and motor functions

(hand steadiness in college students following 10 days of yoga practice). This improvement was believed to be due to improved eye hand coordination, attention, concentration and relaxation^[12]. Yoga is involved in restoring the under activity of the parasympathetic nervous system (PNS) and gamma amino-butyric acid (GABA) systems. The restoration may be partly by stimulation of vagal nerves^[14]. In human beings information processing is affected by the instinctual status, mental status, instinctual and intellectual development. Thus, a person with emotional disturbance or a confused or baffled individual would take more time to respond as compare to other individual with greater intellectual and emotional composure and conceptual clarity^[15]. In chronological studies like ours, it is influenced by the interaction of the individual and the environment which constitutes the degree of stress. Hence it is logical that if specific training in stress management is given then the information processing would improve and the reaction time would reduce^[16]. Here yoga helps in relief of stress, emotional disturbance, confusion and increase spiritual consciousness, attention and memory. Thus yoga in general reduces auditory and visual reaction time and improve attention, concentration and memory of healthy students

CONCLUSION

Yoga practice can influence auditory and visual reaction time by a definite change in attention, alertness, concentration and stress reduction in medical students.

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