

Reducing Anxiety: Effect of Yogic Exercises and Meditation in the Improvement of Anxiety Score, Visual Reaction Time and Finger Dexterity Score

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Research Article

Abstract: Objective: The concept of yoga is helpful for the depression and anxiety disorders have created a great interest in the medical research fields. The present study was designed in order to investigate whether yoga has a positive impact on reducing anxiety. **Background:** In the scenario of ever growing new technology, entering formal workplace; increasing amount of work stress at home & workplace, desire to perform more & more in less & less time, one need to put extra efforts to achieve success [11]. So the stress on an individual goes on increasing. The increased stress lead to stress related disorders. They usually produce negative impact in cognitive, behavioural, autonomic & somatic functions of an individual [6]. There is evidence that the practice of yoga improves physical and mental performance. Yoga included breathing exercises, asana, meditation and relaxation technique helps in decreasing the stress [16]. In the age group of 30 to 40 years problems like learning new technological skills at workplace, job insecurity, job dissatisfaction, lack of time for family, interpersonal relationship, frustration are very common, that causes stress, it is called mid-life crisis [15]. **Method:** in this context, the present study was conducted to see the effect of yogic practices and meditation in reducing anxiety on 50 mildly stressed male volunteers in the age group of 30 to 40 year. Stress was measured by anxiety score as an indicator of stress, also Visual reaction time as an indicator of cognitive function and finger dexterity score as an indicator of motor skills were measured. Anxiety score, visual reaction time (VRT) and finger dexterity score (FDS) were carried out before and after yoga training. **Result:** There was statistically significant improvement in anxiety score, visual reaction time and finger dexterity score ($p < 0.001$) after yoga session. **Conclusion:** Thus, a combined practice of asana, breathing exercises, meditation & relaxation in a sequence is the best available resource to meet the present day needs of society.

Keywords: Yoga, Stress, Anxiety score, VRT, FDS.

1. Introduction

It is estimated that world over almost 80% of all modern day disease have their origin in stress. Stress is a lack of adjustment with the environments. Mind influences the body in profound manner: this forms the basis of psychosomatic origin of disease. Stress is a common experience of all organisms. In our day to day life we confront certain demanding & adverse situations which create mental disturbances and interruption of our smooth social functioning by arousing the felling of mental pressure, tension, anxiety, frustration. In such an adverse situations we are required to make extra

adaptive efforts or arrange for extra resources to cope with them, failing which may have to face painful consequences. The disturbed emotional state aroused by these situations is referred as psychosocial stress [4]. Arousal is a key characteristic of stress response. When psychologist referred to arousal they usually refer to change in autonomic nervous system [3]. Autonomic nervous system changes characteristics of stress conditions include increased heart rate, respiratory rate, blood pressure, sweating of palm, muscular tension, slow down of digestion. Behavioural changes are decreases in performance level, avoidance of stressful situations, passivity/inertia. There is also change in cognitive functions like distraction of thinking, decrease in intellectual functions, anxiety and generalised pattern of thoughts. Stress causes an imbalance of the parasympathetic and sympathetic nervous system due to psychic stimuli causing stress which lead to disturbances of homeostasis in the body. It is here that yoga makes a vital contribution to modern medical system. Regular practice of yoga is the most effective way of achieving a stable sympathovagal balance. Pranayam, yogasanas, meditation bring the mind body relaxation that balance sympathovagal output. Hence, the primary physiological objective of yoga is to achieve the sympathovagal homeostasis [3]. Meditation is associated with decreased in arousal and anxiety [8]. Yoga comprising meditation asanas, breathing exercises, shavasana comprehensively bring about definite changes in cognitive, behavioural, autonomic & somatic functions of an individual, thereby decreasing the anxiety and improving the sensory-motor coordination. The present study is attempted to see the effect of yogic exercises and meditation for 12 weeks on 50 mildly stressed male volunteers in age group of 30 to 40 years working in different organisations. Anxiety was assessed quantitatively using clinical anxiety scale. Visual reaction time was assessed as an indicator of cognitive function. Human Reaction time is the amount of time it takes for a person to respond to stimuli. It is a measure

of sensory motor association. The increase in the reaction time indicates that the consciousness and coordination of an individual is slow. This is due to different factors like arousal, age, gender, anxiety, stress, personality type [7]. So reaction time was used as tool to find out the effect of anxiety on cognitive functions in the subjects. Finger dexterity score was also assessed for the motor skills of subjects. Finger dexterity test can use to know the hand eye coordination or motor skill like performance of an individual [10].

2. Materials and Methods

The present study involved a total 50 mildly stressed male volunteers in age group of 30-40 years working in different organisations of Mumbai, having complaints like headache, loss of appetite, poor sleep, early morning insomnia, vague muscular pain, early fatigability, difficulty in concentration, short temper, irritation, job dissatisfaction, low morale alienation etc. The study was carried out in one of the reputed yoga centre in Mumbai. All participants were experiencing mild level of stress, but had received no current psychiatric diagnosis or treatment. None had significance yoga experiences. None of them was suffering any major medical illness. Ethical clearance was obtained from the institution. The study was a preliminary attempt to know the efficacy of yoga; therefore a control group was not taken. Anxiety was assessed by using clinical anxiety scale (C.A.S.) as given by R.P. Sainath et al [12]. It is six-item anxiety

3. Results

The age & anthropometric parameters of subject are depicted in Table 1 as mean \pm standard deviation (SD).

Table 1: Age & Anthropometric parameters of subjects

Parameters	Mean \pm SD
Age(years)	37.55 \pm 5.84
Body weight(kg)	56.30 \pm 4.30
BMI (kg/m)	20.05 \pm 1.79

Table 2: Anxiety score, VRT & FDS for Pre & post yoga session.

Parameters	Pre	Post	P value
	Mean \pm SD	Mean \pm SD	
N =50			
Anxiety score	5.70 \pm 1.821	4.68 \pm 1.362	0.000***
Visual reaction time	256.70 \pm 46.1 76	248.82 \pm 45.2 44	0.001***
Finger dexterity score	31.92 \pm 3.859	34.68 \pm 4.157	0.001***

There was a significantly decreased in anxiety score, VRT ($p < 0.05$) in the study group after yogic session. Finger dexterity score was significantly increased ($p < 0.05$) after yoga.

4. Discussion

The acute responses to stress help the body to be ready either for "fight"- (confronting the stressor) - or "flight"- (removing you from, or escaping the stressor). Generally, the body's acute responses to stress dissipate

scale having items like psychic tension, ability to relax (muscular tension), startle response, worrying, apprehension, and restlessness. Instructions in each item are graded from 0-4 score. Sum of the score of each item was noted as anxiety score. Visual reaction time was measured by using Digital Response time apparatus having an accuracy of 1 millisecond. Green light was used as a stimulus to measure VRT. The reading was taken between 11am- 1pm in quite secluded room. For each test, practice trials were administered until we were satisfied that the subjects have understood and performed the task as required. Motor skill was assessed by using O' Connor Finger dexterity apparatus. Subjects were instructed to pick up three pins at a time from 300 pins in the metal tray and to fill them in one hole of the metal plate from one direction to the other and use only one hand to fill the holes by pins. We counted the number of pins in one minute. Three reading was taken for each subject and average was noted as finger dexterity score. Yogic session included: Prayer, Meditation: Dhyana, chanting of Omkar & Gayatri mantra, Breathing exercises, Mudras, Asanas, & shavasana. The study group began a daily one hour yoga regime for a total 12 weeks led by a certified yoga instructor. Anxiety score, visual reaction time and finger dexterity test were performed on the volunteers at baseline and again after 12 weeks.

Statistical Analysis: Data was collected and tabulated. Mean and standard deviation were tested statistically by Paired t-test, $P < 0.05$ was taken to be significant.

with time and physiological functions return to normal. However, if there are repeated and/ or sustained encounter with stressor, the stress becomes chronic and the responses have great potential for negative health outcomes. Incidence of stressful life events predicted subsequent illness among persons having low private - self consciousness as compared to person of high consciousness [14]. Arousal is the first change that occurs when a person feels stressed. It causes change in physiological, behavioural & cognitive responses. Sympathetic arousal resulting in increased catecholamine's and cortisol levels mediated through the hypothalamic- pituitary- adrenal axis, is the effect of increased stress & anxiety [4]. Meditation is a complex mental process involving changes in cognitive, sensory perception affect hormones and autonomic activity [1]. Authors studied effect of meditation on anxiety score and found significant reduction of anxiety score after transcendental meditation [1]. Meditation activates prefrontal cortex, which secretes glutamate. Increased glutamate can stimulate the hypothalamic arcuate nucleus to release B- endorphin. It depresses respiration, reduces fear, pain, & produces sensation of joy. Meditations also alter the activity of limbic system. Its stimulation diminishes cortical responsiveness & arousal. The hypothalamus is extensively interconnected with limbic system. Stimulation of

hypothalamus with subsequent stimulation of peripheral parasympathetic system leads to subjective sensation of relaxation, reduction of heart rate & respiratory rate. When an individual's breathing & heart rate slow down, the medulla ceases to innervate the locus ceruleus which produces & distributes NE. Decreased stimulation of LC causes decreases NE. LC delivers less NE to the hypothalamus which secretes less CRH which ultimately decreases cortisol level [1]. The study revealed statistically significant reduction in anxiety score in the volunteers after 12 week practice of yogic exercises & meditations. Yogic practices help in maintaining the equilibrium between the sympathetic & parasympathetic system and gradual shift toward parasympathetic dominance, which gives complete physical & mental relaxation [5]. So Yogic exercises & meditation produces benefits, like improved concentration, improved attentiveness, lower irritability level, improved self-confidence. All these help in the reduction of stress indicator, clearer thinking process, improved intellectual skill, enhanced creativity & an overall increased appreciation for living, which ultimately reduces anxiety. Authors reported that the measure of visual reaction time has been used to evaluate the processing speed of central nervous system and the coordination between the sensory and motor system [6]. Authors say that processing of sensory information at the thalamic level is facilitating during the practice of pranayam and meditation [14]. Yogasanas produces significant reduction in visual and auditory reaction time due to improved eye- hand coordination, better attention, concentration and relaxation. The study revealed statistically significant improvement (reduction) in visual reaction time in volunteers. The effect of different yogasanas and meditation on central nervous system produces benefits like, greater alertness & selective attention, faster rate of information processing, better muscle tone and improved hand eye coordination. Reaction time being a measure of mental events & yoga inducing mental poise and enhancing muscle efficiency there reduces visual reaction time. There was significant increase in the finger dexterity score. Authors say improvement in dexterity skill following yoga training [9-10]. In the present study, statistical significant improvement was found in FDS suggested that there is increase in motor skills. It is mainly due to – meditation improved concentration & attention, different asanas improved the flexibility of joints, hence improved the hand eye coordination. Breathing exercises and relaxation technique like shavasana also contributed to increased mental stability to do such repetitive task performing efficiently. Motivation of the volunteers also improves the motor skills. Anxiety reducing effect of yoga may be responsible for the improvement in FDS. The proprioceptive involvement in a well coordinated manner with mentally relaxed state in the yogic

practices helped the volunteers to achieve the improvement in anxiety score & visual reaction time and finger dexterity score.

5. Conclusion

Yoga session program significantly reduces anxiety score, therefore it is useful in preventing effects of stress and stress induced psychosomatic complaints. Significant reduction in visual reaction time and improvement in motor skills after yogic exercises and meditation indicates,

improved sensory – motor performance, hand eye coordination, flexibility of joints, which may help the volunteers to respond almost instantaneously to different situations, simple as well as complex, in day to day life effectively. Thus, a combined practice of asana, breathing exercises, meditation & relaxation in a sequence is the best available resource to meet the present day needs of the society. Different strategies can be adopted to reduce the effect of stress including:

- Balance between work & family or personal life
- Create support network of friends and co-workers & talk out openly
- Maintain relax and positive outlook
- Change the motto- No one is perfect – perform the best
- Have a balanced diet

In today's busy life the duration should be less as possible if one wants to practice such programs for long period. Therefore an effective regime requiring minimum daily time should be decided.

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