Effect of yogic training on physiological variables in working women

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Abstract
Depression and anxiety in women sharply rising. Working women have high level of stress than non working women. Increasing amount of work stress at home and work place and its impact on family and home environment can be seen, which affect their emotional, psychological and physical health. The concept of yoga is helpful for reducing anxiety and improving cardiorespiratory parameters has created a great interest in the medical research field. The present study was conducted to assessing the effect of yogic exercises and meditation in working women. Yogic session was carried out for 16 weeks. Cardiorespiratory parameters (pulse rate, respiratory rate, blood pressure and breath holding time) were measured before and after yoga training. 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 before and after yoga training. Statistical analysis was done by paired 't' test. It was found that statistically significant improvement in cardiorespiratory parameters, anxiety score, visual reaction time and finger dexterity score (P<0.05) after yogic training. Thus, a combined practice of asana, breathing exercises, and meditation & relaxation technique in a sequence is the best available resource to meet the present day needs of society.

Introduction
We live today in a world that functions in extreme stress conditions, to the point that stress becomes the engine that keeps the wheels spinning. Stress is considered to be a crucial trigger for physical and mental illness (1). Mind influences the body in profound manner: this forms the basis of psychosomatic origin of disease. Since 1968, women lifestyle have changed in many ways, many more women now work outside the home (2). Women mental health is different from men in so many ways. A female has to go through different psycho physiological changes resulting in hormonal issues. And to add to this she is also expected to give birth to children, nurture them, educate them and make them good citizens while also doing her office work, house chores and taking care of husband and of course in laws, especially in our society(3). Women are more sensitive than their spouse to the equality...
The study was carried out in one of the reputed yoga centre in Mumbai city. 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. Subjects practiced yoga session daily one hour from 7am to 8am in the morning for 16 weeks under the supervision of yoga instructors. Thus yoga instructors ensured the compliance by the subjects. Pulse rate (PR), respiratory rate (RR), systolic blood pressure (SBD), diastolic blood pressure (DBP) and breath holding time (BHT) were recorded before and after 16 week of yogic practice session. PR and RR were recorded per minute. BP was measured by mercury sphygmomanometer in the right arm in sitting position. BHT was measured by taking deep inspiration and then holding the breath as long as possible. Anxiety was assessed by using clinical anxiety scale (C.A.S.) as given by R.P. Snaith et al. (6). It is six-item anxiety scale having items like psychic tension, ability to relax (muscular tension), startle response (hyperarousability), 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. The apparatus used to measure reaction time was Research Reaction Timer by Anand Agencies, 1488A, Pune 411082. It is portable device with inbuilt four digit chronoscope with least count of 1/1000 sec. ie. 1 millisecond. A green light stimulus was selected for recording visual reaction time. Each subject was made familiar with the apparatus. All the readings were taken between 11 am – 1 pm in a quiet room. While performing the test, all the subjects were made to sit comfortably in a chair and were motivated to better their results as much as possible. As soon as the stimulus was perceived by the subject, they were asked to respond by pressing the response switch by index finger of dominant hand. Three readings of visual stimulus were noted from auto display in msec. for each subject. After giving three practice trial, lowest reading was taken as the value for the reaction time task, which was considered for statistical analysis.

Motor skills of all the subjects were measured by Johnson O’Connor’s Finger dexterity apparatus by Anand Agencies, 1488A, Pune 411082. This
equipment consists of one metal tray, one metal plate and around 300 metal pins. The metal tray is meant for keeping metal pins. The metal plate consists of 100 holes of depth 0.75 inch made with No. 9 drill. The diameter of each hole is 0.196 inch and is 0.5 inch apart. The metal plate pins are made of brass of 1 inch in diameter of each pin is 0.072 inch. Subject is asked to sit comfortably on chair or stool. The instrument is kept on the table in front of the subject. The height is so adjusted that the subject is comfortable and relaxed while doing the test. Subject is 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 other. The subject is asked to use only one hand. We counted the number of pins in one minute. Three readings were taken for each subject and average was noted as finger dexterity score.

PR, blood pressure (SBP, DBP), RR, BHT, Anxiety score, VRT and FDS were performed on the volunteers at baseline and again after 16 weeks of yogic practice session.


Statistical analysis

The results were analysed using a statistical programme SPSS version 10.0. Mean and standard deviation were tested statistically by Paired t-test. Statistical significance was accepted at P<0.05 level and highly significant at P<0.001.

Results

The results are summarised in Table I. The mean age of the subjects was 37.80±5.84. Table I depicts mean and standard deviation values of different parameters i.e. PR. SBP, DBP, RR, BHT, Anxiety score, VRT and Finger dexterity score (FDS), pre and post 16 weeks yogic training. As shown in the Table, PR (<0.001), SBP (<0.01), DBP (<0.05), RR (<0.001), Anxiety score (<0.001) and VRT (<0.01) significantly decreased after 16 weeks yoga training. BHT (<0.001) and FDS (<0.01) significantly increased after 16 weeks of yoga raining.

Discussion

Autonomic nervous system controls all major functions of the body, smoothens the body responses to environmental changes, coordinates body’s responses to exercises and stress, ANS execute its functions through the sympathetic and parasympathetic system. A stable symapthovagal balance indicates a stable internal homeostasis that not only prevents the occurrence of illness, but also prevents the natural decay and stress induced degeneration of body (7). The study emphasises the effect of yogic kriyas on physiological variables in working women. Significant improvement in physiological variables observed after 16 weeks of yoga training, indicates a shift in the balancing components of autonomic nervous system towards the parasympathetic state.

Sympathetic arousal resulting in increased catecholamine’s and cortisol levels mediated through the hypothalamic-pituitary-adrenal axis is the effect of increased stress & anxiety (8). The study revealed statistically significant reduction in anxiety score in the volunteers after 16 week practice of yogic exercises & meditations. Authors studied effect of meditation on anxiety score and found significant reduction of anxiety score after transcendental meditation (9). Meditation alters the activity of limbic...
system. Its stimulation diminishes cortical responsiveness & arousal. Meditation and different yogasanas influences hypothalamus & autonomic nervous system. The hypothalamus is extensively interconnected with limbic system; it's stimulation with subsequent stimulation of peripheral parasympathetic system leads to subjective sensation of relaxation, reduction in heart rate & respiratory rate. When an individual's breathing & HR slow down, the medulla ceases to innervate the locus ceruleus which produces & distributes norepinephrine. Decreased stimulation of locus ceruleus causes decreases norepinephrine, less norepinephrine to the hypothalamus which secretes less CRH which ultimately decreases cortisol level (10). In yoga, the crucial component is mind-body relaxation. The physical effect of stress are minimised by the influence of relaxation of mind on the body. Pranayam, yogasanas, meditation, relaxation, surrenders to the Divine bring the mind-body relaxation that balances sympthovagal output (9). So Yoga produces benefits, like improved concentration, improved attentiveness, lower irritability level, improved self confidence, & an overall increased appreciation for living, which ultimately reduces anxiety.

During meditation, the load on heart due to sympathetic arousal is also minimised resulting in an improvement in cardiovascular parameters. This should bring about a hypometabolic state (11) resulting in decreased heart rate and blood pressure. Thus yogic exercises & meditation by modifying the state of anxiety reduces the stress induced sympathetic overactivity resulting in a lowering of respiratory and cardiovascular variables. It relaxes the volunteers and thereby decreases arterial tone and peripheral resistance. This may be another reason for fall in blood pressure (12). As a result of yogic training there is improved cardiorespiratory endurance and decreased responsiveness of medullary and peripheral chemoreceptors. These two effects according to Madan Mohan et al (13) have caused increased in breathing holding time. Various yogasanas and breathing exercises lead to increase in initial lung volume due to increase in total lung capacity, which help the volunteers to increased breath holding time.

Authors say that processing of sensory information at the thalamic level is facilitating during the practice of pranayam and meditations (14). 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. Dexterous or skilled actions depend on the speed of gross movements of hand and arms, manual rhythm, and coordination of eye and finger control (15). In the present study, statistical significant improvement was found in FDS, suggested that there is increased in motor skills. It is mainly due to – meditation improved concentration & attention, different asana 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 efficiency.

Conclusion

Yoga forms a pattern of complete exercise for all system of the body; brings harmony to mind and body, modulating stress responses and one's attitude to stress, hence it is an effective preventive tool.

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References


