

Effect of Yogic and Physical Exercises on Physical Physiological and Psychological Variables of Secondary School Students

Sandeep Manikpuri¹, Dr. Narender Kumar²

¹Research Scholar, OPJS University, Churu, Rajasthan

²Research Supervisor, OPJS University, Churu, Rajasthan

Abstract

The research team wanted to see how certain yoga practices and physical activities impacted a variety of health indicators among IT professionals. Thirty overweight women were chosen at random from IT firms in Chennai, Tamil Nadu, to serve as participants for this study. The individuals were randomly assigned to one of three groups of 10 people each: the yogic practices group, the physical exercises group, and the control group. Endurance and resting pulse rate, two physiological measures, were chosen as criterion variables and examined using the Cooper's 9-minute run/walk test and the radial pulse technique before and after the 12-week yoga practices and physical workouts. The ANCOVA was used to determine whether there was a statistically significant difference (if any) between the groups on each of the criteria variables. A number of physical and physiological indicators were found to significantly improve in the yogic practices and physical activities groups compared to the control group. While the control group received no instruction, the yoga practitioners engaged in eight weeks of the Pavanamuktasana sequence, Asana, Pranayama, Meditation, and Relaxation. Pre- and post-experiment measurements of physiological and psychological variables were taken using standardized tests and conventional and adapted questionnaires. Results from an analysis of covariance (ANCOVA) showed that the Pavanamuktasana sequence of poses, together with pranayama, meditation, and relaxation, had a significant impact (P 0.05) on a battery of physiological and psychological characteristics in the elderly.

Keywords: Yoga practices, Physical Exercises, Aerobics, Fitness, Children, Meditation.

1. INTRODUCTION

The word yoga means "union" in Sanskrit, and its spiritual meaning is to unite one's consciousness with the omniscient intellect that permeates all of reality. It is a system of ancient Indian philosophy that emphasizes a variety of breathing techniques, stretches, and meditation practices. The physical practice of yoga includes a variety of stretching and strengthening postures that have been shown to increase stamina and pliability as well as having other impacts on the body's metabolic, physiological, and psychological systems. Patients with diabetes and coronary artery disease have benefited from therapies that use Yoga as a modality by reducing their body weight, blood glucose levels, and total cholesterol. Keeping up with the demands of modern living requires a healthy body and mind, making exercise an important part of everyday life. One of man's defining characteristics from the outset was his independence and acute awareness of his own requirements. But it requires genuine fitness and remarkable choices for every cause and every advancement, on the basis of which it dominates other species. And ever since the dawn of human civilization, his major concern has been his physical well-being. There have been many successful efforts in the modern world to achieve the total or criterion necessary fitness for a given task, using a wide range of approaches and tactics. Explore is the most common and successful method. Everyone uses this method in an effort to further medical knowledge.

As a practice that addresses a man on several levels—biological, social, spiritual, and physical—Yoga plays a pivotal role in the contemporary world and has contributed immeasurably to human flourishing. Once you've lighted the candle of yoga, it will never go out; the more adeptly you practice, the brighter the flame will burn. By practicing yoga regularly, everyone, regardless of age or physical condition, may reach enlightenment. Yoga is a path to optimal well-being, contentment, enlightenment, and knowledge. By improving one's body, mind, and soul, yoga may elevate one's existence to a higher plane. To put it simply, yoga is a way of life that touches every aspect of a person's being on several levels (art, science, and philosophy). For this reason, yoga's impact should permeate all aspect of our daily actions. Yoga is not only a way of life but also a comprehensive

educational program for the development of the whole person (body, mind, and spirit). The Indians used this method thousands of years ago, but it's one of the universal truths that's still valid now and has helped solve a lot of difficulties.

The old saying "a healthy body and a healthy mind" rings particularly true for today's college students. By taking care of themselves physically, students may find it less of a struggle to do well academically, pay attention in class, and manage their time effectively. Students' inability to focus on their work, a lack of eye-hand coordination, an inability to absorb information effectively, and general bad health all contribute to their dismal academic performance today. When it comes to achieving optimal mental and physical wellness, a yoga culture is an absolute must. Body and mind are considered to be one in yogic thought.

Both "yoga" and "yoke" come from the Sanskrit root "yuj," which meaning "unity." Yoga is a psychosomatic spiritual practice aimed at integrating the practitioner's "three bodies" (mind, body, and spirit) and, ultimately, merging their "one mind" with that of the universe (Madanmohan, 2008). Relaxation, meditation, and a series of physical postures done in time with the breath are just some of the components that make up the mind-body practice known as yoga. Because of its holistic nature, it is the most effective approach to ensuring the complete health of its practitioners on all levels: physical, mental, social, and spiritual. Sage Patanjali describes a methodical and disciplined approach to doing yoga called ashtanga (eight-limbed). Dhyana and samadhi, the last two limbs, lead to enlightenment and the awareness of God via the unification of one's own consciousness with that of the universe. As a consequence, a spiritually distinct individual emerges, who is a boon to all of mankind. Yoga aids in the all-around, well-rounded growth of one's character.

2. LITERATURE REVIEW

Dr. Deepa Shivaji Rathod (2021) Like the leaves on a tree, children are hardwired to play. Play is a kind of exercise that develops the child's physical and cognitive skills. The motor system that is crucial for learning abilities "not just for sports but also for life" is dynamic, and so are the kinds of play that help develop that mechanism. It has become more clear over the years that play-based learning opportunities, particularly at the preschool, kindergarten, and elementary school levels, belong as integral parts of the educational experience. Even Nevertheless, there is a severe lack of quality playgrounds in both schools and communities. The youth of today and tomorrow are the society's blossoms and the future of any country. The way they are cared for as a baby affects how they grow up as a person. Success in the future may be influenced by how well they grow socially, psychologically, and even physically. That way, kids have a better chance of becoming upstanding contributors to society. The nation's progress is dependent on its young, industrious population. When kids grow up healthy and whole, they're at their most vibrant and productive.

Tiril Elstad et.al (2020) There is a worldwide crisis with student mental health in today's universities. This is a severe concern for public health that affects a large number of people. The mental health of young people is an important target for the global burden of illness agenda, which necessitates treatments with long-term benefits. To what extent may yoga, a commonly practiced mind-body technique, enhance the emotional well-being of college students was the purpose of this research. A randomized controlled experiment was conducted with 202 healthy Norwegian college students. Using a simple online randomization procedure, the participants were split evenly between a yoga group and a waiting control group. Over a period of 12 weeks, the intervention group participated in 24 yoga sessions. Baseline, post-intervention, and follow-up measurements were obtained at weeks 0, 12, and 24. (follow-up). We used the HSCL-25 questionnaire to measure emotional discomfort as our main outcome. The analysis was carried out using the "intend to treat" approach. We conducted a randomized controlled trial between January 24 and August 27, 2017 and randomly assigned 202 students to either a yoga intervention group (n = 100) or a waiting control group (n = 102). At both post-intervention (adjusted difference in the mean change 0.15, 95% CI 0.26 to 0.03, p = 0.0110) and follow-up (adjusted difference in the mean change 0.18, 95% CI 0.29 to 0.06, p = 0.0025), yoga participants showed significantly reduced distress symptoms compared with the control group. As a result of the intervention and subsequent follow-up, the quality of sleep also improved. There were no documented side effects. Based on our research, it seems that yoga has a somewhat big and enduring impact on lowering distress symptoms and enhancing sleep quality among students, at least for a few months. It is recommended that future studies look for methods to increase the impact, evaluate a longer follow-up time, include active control groups, and maybe even conduct comparable studies in different cultural contexts.

Samantha Sinegar (2019) The purpose of this research was to see whether yoga may help people with experience avoidance (EA), psychological distress (SPD), and drug abuse. The term "emotional avoidance" (EA) describes the futile effort to suppress unpleasant emotions, thoughts, and memories despite their presence.

Yoga is a set of techniques for balancing the mind and body via a series of asanas (postures), pranayama (breathing exercises), and meditation. Participating were college students ($n = 43$) from a yoga class and a basic fitness class who acted as the intervention and active control groups, respectively. Pre- and post-intervention data on EA, SPD (i.e., anxiety, depression), and drug use were gathered through self-report. It was expected that students in the yoga intervention group would show a decrease in EA from Time 1 to Time 2 compared to the control group, and that this decline in EA would mediate the relationship between condition assignment and decreases in both drug use and symptoms of distress. In general, our predictions were wrong. Our results also showed that there were significant variations in EA scores across groups at Time 1.

Arpitaben Tulsibhai Patel et.al (2018) Self-assurance is a vital ingredient in reaching one's goals. "Self-confidence relates to an individual's perceived capacity to behave successfully in a circumstance to overcome hurdles and to get things to go all right," writes Basavanna (1975). Several reports have shown that self-confidence increases as a result of yoga practice. The primary purpose of the research was to examine whether or not yoga might boost one's sense of personal worth. Fifty high school students were chosen at random to participate in the research. Based on a measure of intelligence similar to that provided by the IQ test, two groups were established. One of the groups was chosen at random to serve as the experiment, while the other was used as the control. Prior to receiving treatment, both the experimental and control groups took a test measuring their levels of self-confidence. The experimental group participated in a 21-day yoga therapy that included Yoga Asanas, Pranayama, Meditation, Surya Namaskar, and a value orientation program. The post-test results of the Self Confidence Inventory were compared between the experimental and control groups. Students who participated in yoga classes had higher levels of self-confidence, according to the findings.

3. YOGA PROMOTES PHYSICAL FITNESS

It is common knowledge that practicing yoga may increase one's productivity and efficiency. A prospective controlled research was undertaken by Sharma et al. (2008) to investigate the short-term effects of a holistic yet brief lifestyle intervention based on yoga on individuals' subjective well-being. Participants ranged from healthy people to those with hypertension, heart disease, diabetes mellitus, and other conditions. Within 10 days, they found a statistically significant difference in the individuals' subjective well-being compared to controls. So, even a short intervention may make a significant difference in the primary prevention and treatment of lifestyle illnesses. Seniors (aged 65–85) who practiced hatha yoga for 6 months had substantial improvements in quality of life and physical metrics compared to walking exercise and wait-list control groups, according to research published in 2006.

NERVOUS SYSTEM

- Electroencephalographic (EEG) studies
- Sleep
- Yoga practice decreases Anxiety levels
- Yoga improves cognitive functions
- Yoga practices alter brain blood flow and brain metabolism
- Neuro-transmitters
- Stress

4. METHODOLOGY

The researchers wanted to see how different yoga practices and physical workouts impacted different aspects of their health and well-being among IT professionals. Forty-five IT professionals working for IT firms in Chennai, Tamil Nadu, were chosen at random as participants for this study. The individuals were randomly assigned to one of three groups of 10 people each: yogic practices group, physical exercises group, and control group. For a total of twelve weeks, members in the experimental group had their designated training on alternating Wednesdays. As criterion variables, we chose endurance and resting pulse rate, two measures of physiology that were examined using the Cooper's 9-minute run/walk test and the radial pulse technique before and after a 12-week regimen of yogic practices and physical exercises. For each criteria variable, we used the ANCOVA to determine whether or not there was a statistically significant group difference. Since there were three groups to compare, we utilized Scheffe's post hoc test to identify any changes in paired means where the 'F' ratio for the adjusted posttest means was significant.

The goal of this research was to compare the experimental groups on psychological characteristics including anxiety-related behavior and the influence of yoga Sana and physical activities. One hundred and thirty students from Government High School were randomly chosen to participate in the experiment and were split into two groups of 100. Both Group I and Group II engaged in a rigorous twelve-week yogasan and physical activity regimen. Group III was the control and consisted of students who did not participate in any further training beyond their normal physical education lessons. Because the 'F' ratio found by analysis of covariance was deemed suitable, we used a significance threshold of 0.05 to test it.

There were a total of 80 people used in the study, split evenly between two groups of 40. Pre- and post-training assessments would be administered, with the first group (the "experimental group") undergoing yoga training and the second (the "control group") not participating in any yoga training at all. For a total of eight weeks, you'd get training. Using a scientific approach, we can determine the impact of yoga practices on a subset of physiological and psychological factors in elderly women. Analysis of covariance was used for statistical analysis of the data gathered (ANCOVA).

Training Schedule

Experimental Group: Yogic practices

Training Programme:

1. Pavanamuktasana series
2. Suryanamaskar (Bihar School of Yoga) - 12 counts

Asana	Breathing
1. Pranamasana	Normal
2. Hasta Uttanasana	Inhale
3. Padahastasana	Exhale
4. Ashwa Sanchalanasana	Inhale
5. Parvatasana	Exhale
6. Ashtanga Namaskara	Holding
7. Bhujangasana	Inhale
8. Parvatasana	Exhale
9. Ashwa Sanchalanasana	Inhale
10. Padahastasana	Exhale
11. Hasta Uttanasana	Inhale
12. Pranamasana	Normal

Yogasanas

1. Padmasana, Vajrasana, Paschimottanasana
2. Tadasana, Trikonasana, Padahastasana, Ardha Chakrasana
3. Salabhasana, Bhujangasana, Dhanurasana

4. Viparitarani, Sarvangasana, Halasana, Uttanapadasana

5. Savasana (Relaxation)

Pranayama

1. Anulom, Vilom
2. Nadi Shodhana
3. Sitali
4. Sitkari
5. Bhastrika

5. DATA ANALYSIS

Selected physical and physiological characteristics, including endurance and resting heart rate, were measured and analyzed before and after the study period for both the yogic practices and physical exercises group and the control group, and the results are provided in Table-1.

Table 1: Analysis of covariance of data on anxiety and stress between pre and post-test of yogic practices group and physical exercises group and control group

Variables	Test	Yogic Practices Group	Physical Exercise Group	Control Group	Source of Variances	Sum of Squares	df	Mean Squares	Obtained 'F' Ratio
Endurance (Meters)	Pre-Test	1317.67	1305.33	1323.33	B	28007.78	2	14003.89	1.02
					W	579250.00	42	13791.67	
	Post-Test	1586.33	1533.33	1361.26	B	271234.44	2	135617.22	9.9*
					W	571640.00	42	13610.48	
Adjusted Post-Test	1610.66	1585.02	1375.89	B	265788.29	2	132894.15	9.54*	
				W	571141.27	41	13930.27		
Resting Pulse Rate	Pre-Test	79.73	79.47	79.60	B	0.53	2	0.267	0.07
					W	172.27	42	4.10	
	Post-Test	76.67	75.73	80.07	B	156.04	2	78.02	5.40*
					W	607.20	42	14.46	
	Adjusted Post-Test	76.56	75.84	80.07	B	153.47	41	76.73	6.23*
					W	504.619	2	12.31	

Table f-ratio at 0.05 level of confidence for 2 and 42 (df) = 3.22, 2 and 41 (df) = 3.23. *Significant

The adjusted posttest mean values for endurance achieved a "f" ratio of 9.54, which is larger than the needed table value of 3.23 for significance with df = 2 and n = 41 (see Table 1). The research found statistically significant differences in endurance levels across the groups.

The corrected posttest mean values for resting pulse rate achieved a "f" ratio of 6.23, which is larger than the table value of 3.3 necessary for significance with df = 2 and 26 (see table 1). Three groups were found to have statistically different resting heart rates than the control group.

Table 2: Schefft's post hoc test for the difference between six paired adjusted post-test means of endurance and resting pulse rate

Variables	Yogic Practices	Physical Exercise	Control	Mean	Confidence
-----------	-----------------	-------------------	---------	------	------------

	Group	Group	Group	Difference	Interval
Endurance	1610.66	1585.02	-	25.64	107.31
	1610.6	-	1375.89	234.77*	107.31
	-	1585.02	1375.89	209.13*	107.31
Resting Pulse Rate	76.56	75.84	-	0.73	3.19
	76.6	-	80.07	3.50*	3.19
	-	75.84	80.07	4.23*	3.19

Significant at 0.05 level of confidence.

As can be seen in Table 2, the obtained confidence interval values were higher than the 107.31 value at the 0.05 level, indicating that there was a statistically significant difference in endurance between the yogic practices group and the control group, the yogic practices group and the physical exercises group, and the physical exercises group and the control group. Table 2 shows that there was a statistically significant difference in resting heart rate between the yogic practices group and the physical exercises group (0.73 versus 3.50 versus 4.23), the yogic practices group and the control group (3.50 versus 4.23), and the physical exercises group and the control group (.05 versus 3.19).

Data on aggressive behavior was gathered before and after the experimental session via the use of standardized questions administered to secondary school pupils at a residential school in the Vijayapura district of Karnataka; the findings are provided in table -3 below.

Anxiety behaviour:

It was predicted that those in the Yoga group would exhibit less anxiety than those in the physical activities group. The hypothesis was based on the assumption that frequent practice of yoga asanas and meditation techniques would help its practitioners gain emotional control and learn techniques for dealing with stress and anger.

Table 3: Computation of Covariance of academic Anxiety level of control Group, Experimental group1 (Yogic Exercises) and Experimental group 2 (Physical Exercises) of Secondary school students.

Source Variance	Df	Sum of the Square	Mean square	Remarks
Between the group	2	130.341	65.17	71.608
Within the group	296	132.875	0.916	

Significant at 0.05 level

Table 4: Anxiety means differences of control group (A), Experimental group 1(B) (Yogic Exercise) and experimental group 2(C) (Physical Exercise)

Group	M1	M2	Diff
Group C & E1	12.983	11.047	1.936
Group C & E2	12.983	10.936	2.047
Group E1 & E2	11.047	10.936	0.111

Table 4 demonstrates that the calculated F ratio is larger than the table Adjusted paired means that were statistically significant were discovered using value and data. According to the data analysis, students who engage in regular physical activity have lower average test scores and exhibit less academic anxiety behavior

than their counterparts who do not engage in such activities (Yogic exercise and control group). This might be because regular physical activity fosters competence and command over feelings, self-assurance, outlook, character, and behavior in those who engage in it. Anxiety is a condition that affects the mind and intellect, hence yogic techniques may be helpful in treating it. Anxiety results from discord between the brain's many functions, which in turn causes discord in the autonomous nervous system and the formation of unhelpful, irrational beliefs and mental roadblocks at the cognitive level. Yogasana helps maintain the body in a state of relaxation, while pranayama techniques reduce sympathetic nervous system dominance and meditative activities quiet the mind. Mantra chanting is a technique for distracting oneself from negative emotions and ideas.

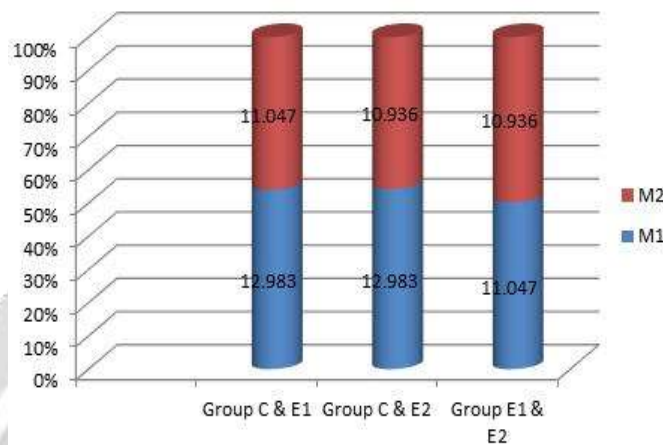


Fig 1: showing the mean difference in Anxiety behaviour of yoga and Physical exercises practitioners

Discussions on the Findings of Physiological Variables

Taking into account the pre-test and post-test means, the adjusted post-test means were determined, and analysis of covariance was performed; the obtained F value of 47.89 was greater than the required value of 3.22, so it was accepted that the yogic practices significantly improved (decreased) the resting pulse rate of the elderly.

Table 5 displays the results of a statistical study contrasting the early and ultimate sources of stress among female geriatrics, all of which may be attributed to yoga.

Table 5: Computation of Mean and Analysis of Covariance of Stress of Experimental and Control Group (Scores in marks)

Test	Experimental group	Control group	Source of variance	Sum of square	Df	Mean Squares	Obtained F
Pre-test mean	109.90	107.10	Between	78.40	1	78.40	0.57
			Within	5211.60	38	137.15	
Post-test mean	71.90	103.85	Between	10208.03	1	10208.03	61.90*
			Within	6266.35	38	164.90	
Adjusted mean	71.12	104.63	Between	11056.22	1	11056.22	87.61*
			Within	4669.18	37	126.19	

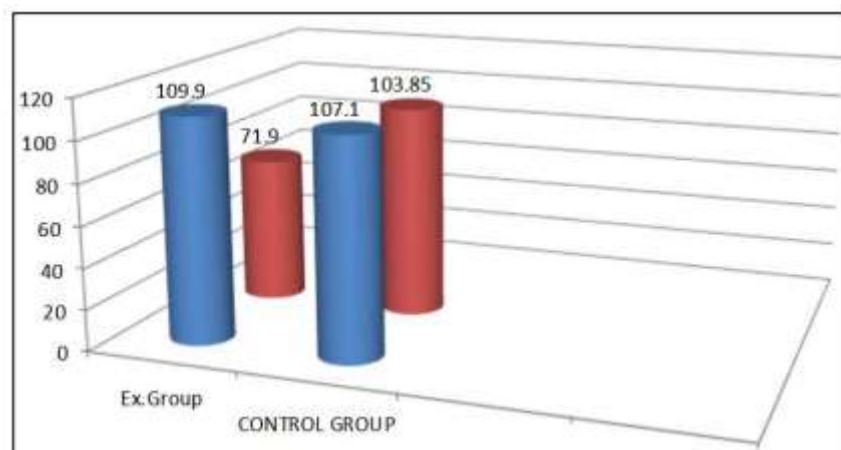


Fig 2: Bar Diagram on Ordered Pre and Post Means of Stress

Discussions on the Findings of Psychological Variables

Adjusted post-test means were determined using pre- and post-test means, and analysis of covariance was performed; the obtained F value of 87.61 was greater than the required value of 3.22, so it was concluded that geriatrics who engaged in yogic practices experienced a significant improvement (decrease) in their levels of stress.

6. CONCLUSION

Twelve weeks of yogic practices and physical exercises led to substantial improvements in psychological variables including anxiety and stress, compared to the control group. The study's findings indicate a noteworthy dissimilarity between the subsets of participants. The yoga practice group fared worse than the physical activity group. Physical activity was found to be a major contributor to the emergence of stress and anxiety among rural secondary school students; consequently, it was suggested that yoga and other forms of physical activity be incorporated into the academic curriculum at this level, where they could help students achieve both personal and academic success. Study results demonstrated that the experimental group I (Yogic Practices) had a lower resting heart rate and less stress than the control group I (No Yogic Practices) (Yogic Practices) There has to be a balance between almost everything. By itself, yogic practices are a positive move in the direction of a more balanced and healthier way of living. It's crucial to remember that, as individuals, we're more than just our minds, and that we need to take care of both. Yogic practices may help us in several ways, including lowering our resting heart rate and decreasing our levels of stress.

7. REFERENCES

1. Dr. Deepa Shivaji Rathod et.al "Effects of Yogasanas on Physiological and Psychological Variables of High School Girls" Volume 9, Issue 3 March 2021 | ISSN: 2320-2882
2. Tiril Elstad et.al "The effects of yoga on student mental health: a randomised controlled trial" <https://doi.org/10.1080/21642850.2020.1843466>
3. Arpitaben Tulsibhai Patel et.al "Effect of Yoga Exercise on Self Confidence of Secondary School Students" October-December 2018, Year-3, Volume-4
4. Samantha Sinegar "Investigation Of The Effects Of A Yoga Intervention On Experiential Avoidance, Symptoms Of Psychological Distress, And Substance Use"2019
5. Cheng, S. S., Zhang, C. Q., and Wu, J. Q. (2020). Mindfulness and Smartphone Addiction before Going to Sleep among College Students: The Mediating Roles of Self-Control and Rumination. *Clocks Sleep* 2, 354–363. doi: 10.3390/clockssleep2030026
6. Gao, L., and Li, F. M. (2021). Relationship between sleep quality with depression and anxiety symptoms in college students at Tibet Plateau areas. *Chin. J. Sch. Health* 42, 593–596. doi: 10.16835/j.cnki.1000-9817.2021.04.026
7. Butz, S., and Stahlberg, D. (2018). Can self-compassion improve sleep quality via reduced rumination? *Self Identity* 17, 666–686. doi: 10.1080/15298868.2018.1456482
8. Chen, S. Y., Zhou, R. L., and Jia, Y. Y. (2012). *Chinese. J. Clin. Psychol.* 20, 148–151.

9. Andreotti, E., Congard, A., Le Vigouroux, S., Dauvier, B., Illy, J., Poinot, R., et al. (2018). Rumination and Mindlessness Processes: Trajectories of Change in a 42-Day Mindfulness-Based Intervention. *J. Cogn. Psychother.* 32, 127–139. doi: 10.1891/0889-8391.32.2.127
10. Archer, T., Josefsson, T., and Lindwall, M. (2014). Effects of physical exercise on depressive symptoms and biomarkers in depression. *CNS Neurol. Disord. Drug Targ.* 13, 1640–1653. doi: 10.2174/1871527313666141130203245
11. Telles S, Nagarathna R, Vani PR, Nagendra HR. A combination of focusing and de-focusing through yoga reduces optical illusion more than focusing alone. *Indian J Physiol Pharmacol* 1997;41:179-82.
12. Michaels RR, Huber MJ, McCann DS. Evaluation of Transcendental Meditation as a Method of reducing stress. *Science* 1992;4245:1242-4.
13. Sahasi G, Mohan D, Kacker C. Effectiveness of yogic techniques in the management of anxiety. *Journal of Personality and Clinical Studies* 1989;1:51-5.
14. Singh RH, Udupa KN. Psychobiological studies on certain hatha yoga practices. Paper presented at the international seminar on stress in Health and Diseases. Varanasi: Banaras Hindu University; 1977.

