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Impact of Pranayama and Surya Namaskar Practices on College OBSE Students' Physical and Physiological Variables

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ABSTRACT

The purpose of Surya Namaskar is to strengthen the body's connection to the divine, rejuvenate the mind, and channel solar energy into the body. It comprises of 12 distinct postures that are executed in a sequential manner, with fluid transitions that are synchronized with movement and breathing. Contrarily, pranayama includes a variety of breathing exercises that include regulating the depth, pace, and length of breaths as well as purposeful breath retention following inhalation or exhalation. Investigating the effects of Surya Namaskar and Pranayama techniques on particular physical and physiological markers in obese male college students was the goal of this study. Thirty male students, ages 18 to 22, were chosen for this study from the Coimbatore district's Sri Ramakrishna Mission Vidyalaya Institutions Boys Hostels, Swami Brahmananda, Swami Yogananda, and Swami Akandananda. Two groups of 15 people each were randomly selected from among the participants. While Group II (control group) did not take part in any interventions, Group I (experimental group) received a combination program of Surya Namaskar and Pranayama. During the course of the 12-week intervention, data was gathered both before and after the training session. Flexibility, muscular strength, and muscular endurance were among the physical fitness metrics evaluated, along with the physiological variable of breath-holding time. To ascertain statistical significance, the gathered data was examined using the "t" ratio. Following the intervention, the experimental group's physical and physiological characteristics significantly improved, according to the results, proving the efficacy of Surya Namaskar and Pranayama exercises.

Keywords: Surya Namaskar, Pranayama, Flexibility, Muscular Strength and Endurance, Breath Holding Time.

INTRODUCTION

Surya Namaskar: An Adaptive Yogic Order The dynamic series of 12 yoga poses known as Surya Namaskar, or Sun Salutation, works the entire body and fosters mental and emotional health. In order to match with natural energy rhythms, this technique is typically done in the early morning on an empty stomach, ideally facing the rising sun. Two sets of 12 asanas are performed in a continuous, flowing sequence during each round of Surya Namaskar. Exhaling during contractions and inhaling during extensions, the motions are timed to the breath, forming a pattern that strengthens the bond between the body, breath, and mind. In addition to enhancing the physical advantages, this well-coordinated flow promotes serenity and inner awareness. For college students, Surya Namaskar is a convenient and efficient workout regimen that provides several benefits like heightened energy, enhanced flexibility, and decreased stress. It also helps with weight management and improves general health when practiced regularly. Engaging main muscle groups and stimulating critical organs, it is a holistic workout that promotes physical fitness and increased vitality. The Science of Breath Regulation by Pranayama Controlling the timing, depth, and pattern of inhalation, expiration, and breath retention is known as pranayama, and it is a fundamental aspect of yoga with roots in Ayurvedic tradition. Pranayama is commonly combined with yoga poses (asanas) and meditation (dhyana) to create a triad that promotes overall health. Numerous pranayama techniques, such as Bhramari (bee breath), Ujjayi (victorious breath), Bhastrika (bellows breath), and Nadi Shodhana (alternate nostril breathing), provide distinct advantages tailored to various emotional and physical requirements. Pranayama has been linked to a number of health advantages, including less stress, better sleep, increased awareness, improved lung function, and lowered blood pressure, according to scientific study. Additionally, it has been shown to be successful in lowering cravings for cigarettes and other addictive behaviors.

TECHNIQUE OF SURYA NAMASKAR

One round of Surya Namaskar consists of following twelve postures

Step 1. Pranamasana (Prayer Pose): Stand at the edge of your mat with your feet together, balancing your weight equally on both feet. Expand your chest and relax your shoulders. As you breathe in, lift both arms up from the sides, and as you exhale, bring your palms together in front of your chest in the prayer position. Step 2. Hastauttanasana (Raised Arms Pose): Inhale and lift your arms up and back, keeping your biceps close to your ears. In this pose, aim to stretch your entire body upwards, from your heels to the tips of your fingers. Step 3. Hastapadasana (Standing Forward Bend): Exhale and bend forward from the waist, keeping the spine straight. As you exhale completely, bring your hands down to the floor beside your feet. Step 4. Ashwa

Sanchalanasana (Equestrian Pose): Inhale and push your right leg back as far as possible. Bring your right knee to the floor and look upwards. Step 5. Dandasana (Stick Pose): Inhale and take your left leg back, bringing your entire body into a straight line. Step 6. Ashtanga Namaskara (Salute with Eight Parts): Gently bring your knees to the floor and exhale. Move your hips back slightly, then slide forward, resting your chest and chin on the floor. The eight parts of your body (two hands, two feet, two knees, chest, and chin) should touch the floor. Step 7. Bhujangasana (Cobra Pose): Slide forward and raise your chest into the Cobra pose. Keep your elbows bent, with your shoulders away from your ears. Look up towards the ceiling. Step 8. Adho Mukha Svanasana (Downward-Facing Dog Pose): Exhale and lift your hips and tailbone up, forming your body into an inverted 'V' shape. Step 9. Ashwa Sanchalanasana (Equestrian Pose): Inhale and bring your right foot forward, placing it between your hands. Lower your left knee to the floor, press your hips down, and look upwards. Step 10. Hastapadasana (Standing Forward Bend): Exhale and bring your left foot forward, keeping your palms on the floor. You may bend your knees slightly if necessary. Step 11. Hastauttanasana (Raised Arms Pose): Inhale and roll your spine up. Lift your hands upwards and bend backward slightly, pushing your hips slightly outward. Step 12. Tadasana (Mountain Pose): Exhale, straighten your body, and bring your arms down. Relax in this position and observe the sensations in your body.

TRAINING METHOD

For this study, the training program consisted of Surya Namaskar and Pranayama. The training was conducted 5 days a week for a total duration of 12 weeks. Each session lasted for 60 minutes. The training began with stretching exercises for 10 minutes, followed by Surya Namaskar. Initially, 5 to 10 repetitions of Surya Namaskar were performed, with a 30-second rest between sets. The repetitions were gradually increased over the 12 weeks. After completing the Surya Namaskar, a 60-second rest was given, followed by Pranayama exercises. These exercises also started with 5 to 10 repetitions, with 30-second rests in between sets. As with Surya Namaskar, the repetitions of Pranayama were gradually increased throughout the 12 weeks. The following schedule outlines the full training program:

SEQUENCE OF TRAINING

Each week's Surya Namaskar training regimen included particular repetitions and Pranayama exercises. The comprehensive schedule is provided below: Surya Namaskar: 4 repeats Pranayama (4 sets): Chandra Badhana, Suryabhadhana, Nadisudhi Pranayama, and Ujjayi Pranayama, Weeks 1 and 2. Weeks Three and Four Surya Namaskar: four sets of pranayama repetitions: Moorchha, Bhastrika, Shitali, and Bahya pranayama. Weeks 5 and 6 Surya Namaskar: Pranayama (6 sets): Udgat Pranayama, Kapalabhati Pranayama, Bramari Pranayama, and Nadisodhana Pranayama. Weeks 7 and 8 Digna Pranayama, Shakti Pranayama, Shithakari Pranayama, and Anuloma Viloma Pranayama are the six repetitions (6 sets) of Surya Namaskar Pranayama. Weeks 9 and 10 Surya Namaskar: Kapalabhati Pranayama: 8 sets of repetitions Pranayama Moorchha Ujjayi Pranayama and Shadhantha Pranayama. Weeks 11 and 12: Pranayama (8 sets) Surya Namaskar (8 repetitions): Pranayama Bramari Pranayama Kapalabhati The following Pranayamas are known: Udgat, Bhastrika, Nadisodhana, Shitali, Shithakari, and Shakti.

MEANS AND METHODS

Thirty male college students were chosen as subjects for the current study from Sri Ramakrishna Mission Vidyalaya Institutions, including Sri Ramakrishna Mission Vidyalaya Polytechnic College and Sri Ramakrishna Mission Vidyalaya College of Arts & Science. All of the students were staying at several boys' dormitories in the Coimbatore district, including Swami Brahmananda Hostel, Swami Yogananda Hostel, and Swami Akandananda Hostel. Out of the thirty subjects, fifteen opted to be in the experimental group, which took part in the training program. The other fifteen were placed in the control group, which did not take part in any training. Each session of the 12-week training program lasted 60 minutes and was held every morning from 6:00 to 7:00 am. For both groups (Group I and Group II), pre- and post-tests were administered before to and following the training session. The following factors related to physical fitness were examined: The Sit and Reach Box Test is used to measure flexibility (in millimeters). Muscular endurance and strength are quantified by the number of sit-ups performed in a minute. Furthermore, the subsequent physiological variable was examined: Breath Holding Time: In seconds, as determined by the Nose Clip Method.

Statistical Technique

Statistical analysis of the data was performed for each group using mean and standard deviations. The paired t-test was used to compare the pre- and post-test values within each group. The difference between the two groups for the variables was determined using the independent t-test. The derived results are discussed as follows:

Table 1: Computation of 't' Ratio on Flexibility, Muscular Strength and Endurance, Breath Holding Time Experimental Group and Control Group

Groups	Variables	Tests	Mean	Std deviation	Mean Difference	Std. Error	t' ratio
Experimental Group	Flexibility	Pre test	15.94	8.32	2.73	0.18	15.04*
		Post test	18.67	8.68			
	Muscular Strength Endurance	Pre test	34.13	3.71	5.00	0.83	5.95*
		Post test	39.13	5.15			
	Breath Holding Time	Pre test	35.79	9.81	2.33	0.31	7.32*
		Post test	38.13	10.45			
Control Group	Flexibility	Pre test	15.42	1.15	0.51	0.32	1.60
		Post test	14.91	1.32			
	Muscular Strength Endurance	Pre test	31.46	4.06	0.73	0.45	1.70
		Post test	30.73	3.75			
	Breath Holding Time	Pre test	35.13	3.68	1.00	1.05	0.94
		Post test	34.13	4.24			

*Significant level 0.05 level, Degree of freedom (2.145, 1 and 14)

Table I reveals the computation of mean, standard deviation and 't' ratio on selected physical and physiological variables namely, Flexibility, Muscular Strength and Endurance, and Breath Holding Time on experimental group. The obtained 't' ratio on Flexibility was 15.04, Muscular Strength Endurance was 5.95, and Breath Holding Time was 7.32, respectively. The required table value was 2.145 for the degrees of freedom, 1 and 14 at the 0.05 level of significance. Since the obtained 't' values were greater than the required table value it was found to be statistically significant on experimental group. Further the computation of mean, standard deviation and 't' ratio on selected physical and physiological variables namely Flexibility, Muscular Strength and Endurance, and Breath Holding Time on control group. The obtained 't' ratio was 1.60, 1.70 and 0.94 respectively. The required table value was 2.145 for the degrees of freedom 1 and 14 at the 0.05 level of significance. Since the obtained 't' values were lesser than the required table value it was found to be statistically insignificant.

DISCUSSION

The goal of the current study was to evaluate how a 12-week practice of Surya Namaskar and Pranayama affected a few physical and physiological characteristics in college-level obsessive students. Breath-holding time, physical strength and endurance, and flexibility were among the characteristics that were investigated. The results unequivocally suggest that the experimental group, who took part in a systematic program of Pranayama and Surya Namaskar, demonstrated statistically significant improvements in every variable that was assessed. The control group, however, showed no such improvements. Flexibility: The experimental group's pre-test mean increased from 15.94 to a post-test mean of 18.67 ($t = 15.04$), indicating a statistically significant improvement in flexibility. The dynamic and static stretching elements of Surya Namaskar, especially through poses like Hastapadasana, Ashwa Sanchalanasana, and Adho Mukha Svanasana, are primarily responsible for this improvement. A wider range of motion is encouraged by these poses, which actively lengthen and engage the main muscle groups. Maintaining functional mobility requires this kind of flexibility, not just for athletes but also for all students. These results are in line with earlier studies showing that yoga-based therapies can result in notable increases in flexibility. In 2011, Gaurav et al. Strength and endurance of the muscles: With a pre-test mean of 34.13 and a post-test mean of 39.13 ($t = 5.95$), the experimental group demonstrated a substantial increase in physical strength and endurance. Postures like Pranamasana, Dandasana, and Bhujangasana, which incorporate isometric contractions and repeated muscular engagement, are part of Surya Namaskar, which is frequently thought of as a dynamic fusion of strength and aerobic conditioning. Over time, these factors work together to promote the growth of physical strength and improved endurance. The results provide credence to the idea that yoga, especially Surya Namaskar, can be used as a bodyweight resistance training method. Holding Time of Breath: The experimental group's breath-holding time significantly improved, as evidenced by the pre-test mean rising from 35.79 to 38.13 ($t = 7.32$). The training program's use of several pranayama techniques, such as Anuloma Viloma, Nadi Shodhana, Kapalabhati, Bhastrika, and Ujjayi, is responsible for this improvement. These exercises develop autonomic control, enhance lung function, and control breathing patterns. The better mental focus and stress resilience, in addition to physiological adaptations like increased pulmonary efficiency, are reflected in the increased breath-holding ability. These results are in line with earlier research demonstrating how pranayama might improve mental and respiratory health (Sengupta, 2012). Comparison with Control Group: On the other hand, no discernible changes were seen in any of the variables that were measured in the control group, which did not take part in any particular intervention. Their t-values for flexibility (1.60), muscular strength and endurance (1.70), and breath-holding time (0.94), respectively,

stayed below the statistical significance threshold. These results further support how beneficial the organized Surya Namaskar is and the experimental group underwent a Pranayama training program. Implications: These results demonstrate the potential of yoga, and more especially the combination of Surya Namaskar and Pranayama, as an approachable and comprehensive training technique for improving young adults' physical fitness and physiological resilience. This intervention is simple, inexpensive, and requires little equipment, making it easy to incorporate into everyday hostel routines and college-level physical education curriculum.

CONCLUSION

The current study finds that among college-bound obsessive students, a 12-week organized training program that includes Surya Namaskar and Pranayama routines significantly improves a few physical and physiological indicators. While the control group showed no discernible changes, the experimental group showed considerable gains in breath-holding duration, physical strength and endurance, and flexibility. These findings highlight how well traditional exercises like Surya Namaskar and Pranayama may be incorporated into everyday routines to improve young adults' general physical fitness and physiological efficiency. These practices provide a useful way to promote health and well-being since they are realistic, economical, and comprehensive, especially in institutional and educational settings.

Given these results, it is advised that colleges and institutions include Surya Namaskar and Pranayama in their wellness or physical education curricula, particularly for students living in dorms where there may not be many opportunities for physical activity.

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