



EFFECT OF THE 5 PRANAYAMAS VERSUS SUDARSHAN KRIYA ON NECK PAIN, STRESS AND ANXIETY IN COLLEGE GOING STUDENTS: AN EXPERIMENTAL STUDY

Physiotherapy

Dr. Mayuri R. Shah

MPTh, Assistant Professor, Dr. D. Y. Patil Vidyapeeth, Dr. D. Y. Patil College of Physiotherapy, Pimpri, Pune

Miss. Divya K. Patil

BPT, Intern, Dr. D. Y. Patil Vidyapeeth, Dr. D. Y. Patil College of Physiotherapy, Pimpri, Pune

ABSTRACT

Background: According to the American Psychological Association, anxiety and depression are both emotional responses that cause symptoms that are very similar, such as difficulty sleeping, fatigue, muscle tension, and irritability. Whereas stress is usually caused by an external factor and is temporary, anxiety is persistent even in the absence of a stressor. Psychosocial factors are determinants, risk factors, and prognostic factors for neck pain. **Aim:** To find the effect of the 5 Pranayamas versus Sudarshan Kriya on Neck Pain, Stress and Anxiety **Methods and Material:** Participants fulfilling the inclusion criteria were selected for the study. Informed and signed consent was taken from participants prior to commencing the study. Pre-readings were taken. Participants were randomly allocated in 2 groups, 15 in Group A and 15 in Group B respectively. Group A was given Sudarshan kriya and Group B was given 5 types of Pranayamas for 4 weeks 5 days a week for 30 minutes each day. **Results:** Paired and unpaired t test was used for within and between group analysis where $p < 0.05$. **Conclusion:** The study concludes that Sudarshan kriya was more effective in reducing neck pain, stress and anxiety as compared to the 5 Pranayamas given individually.

KEYWORDS

Pranayamas, Sudarshan Kriya, Neck Pain

INTRODUCTION:

One of the most important determinants of life quality and satisfaction is mental health. Higher education is a stressful time in students' lives that they must deal with for a variety of reasons, including living away from their families, a heavy syllabus, and inefficiency in higher education programmes. Poor mental health is a complicated and widespread psychological issue among university undergraduate students in both developed and developing countries. According to psychological studies, the prevalence of stress, anxiety, and depression (SAD) is higher among university students than in the general population. Poor mental health can cause distress in students, lowering their quality of life and academic performance. ⁽¹⁾ Because college students face a variety of stressors, such as academic, social, or time management issues, educators and mental health providers must implement interventions to reduce anxiety and improve the quality of mental health education. ⁽²⁾ Previous research has found a link between stress, anxiety, and neck pain. Recent Cochrane reviews investigated the effects of therapeutic options such as exercise, manipulation and mobilisation, acupuncture, medicinal and injection therapies. The authors conclude that there is insufficient evidence to recommend for or against these non-psychosocial therapeutic options focusing on somatic symptoms. However, these treatments have recently been recommended by the Bone and Joint Decade Task Force on Neck Pain and Its Associated Disorders for the period 2000-2010 and are widely used in primary care. ⁽³⁾ Previous research has found that Population with Medical Disorder including chronic fatigue, chronic pain has been benefitted with Sudarshan kriya. ⁽⁴⁾

Academic pressure from factors such as exams and workload, a lack of leisure time, competition, concerns about not meeting parents' expectations, establishing new personal relationships, and moving to a strange location are all sources of stress during college life. Biological factors such as age and gender, particularly being female, are also sources of stress. ⁽⁵⁾ Despite all efforts to raise awareness and address mental health issues among university students, there is still an increase in depression and suicide among students, indicating that the measures in place are ineffective. ⁽¹⁾ A substantial body of evidence indicates that patient characteristics such as psychosocial factors are determinants, risk factors, and prognostic factors for neck pain. This knowledge, however, has not yet been incorporated into recommendations to primary care physicians on how to treat their patients with common neck pain. Given the ambiguous benefit of existing neck pain therapies and the lack of consideration for psychosocial patient characteristics in clinical guidelines, more research is needed to determine which patients would benefit more from psychosocial interventions than from immediate somatically based therapies such as medicinal or manipulatory therapy. ⁽⁶⁾ Yoga's origins can be traced back to the ancient Rishis 8000 years ago. Over many centuries, various forms of yoga evolved to restore and maintain

health as well as to elevate self-awareness and consciousness. "Prana" translates as "life force" or "energy." Pranayama is an ancient science of breath that means both "control of energy" and "expansion of energy." The ultimate goal of medical sciences is to achieve physical and mental health for individuals. The ultimate goal of all yogic practises is the same: physical and mental well-being. Sudarshan kriya is a new yoga practise that has emerged in recent years. Sudarshan Kriya (SK) is derived from the Sanskrit words su-right, darshan-vision, and kriya, which means purifying action. Sudarshan Kriya yoga is based on the Vedic yogic sciences of breath. ⁽⁶⁾ So this study will help us understand the effect of this new technique on anxiety and stress in college students with neck pain. The objective of the study was to compare the effect of The 5 Pranayamas and Sudarshan Kriya on Neck Pain, Stress and Anxiety in College going students using Neck disability index, Perceived stress scale and Hamilton anxiety rating scale.

METHODOLOGY:

This was an experimental study carried out in Dr. D. Y. Patil College of Physiotherapy in college going students aged 19-25 years including both genders. Sampling type was purposive and size was 30. Students who had a score of 15-24 on Neck disability index, ≤ 26 on Perceived Stress Scale and ≤ 24 on Hamilton Anxiety Rating scale were included in the study. While students going to gym or doing any form of exercise, undergoing any treatment for stress, anxiety and neck pain and having medical history of diabetes mellitus, lung infection like pneumonia, bronchitis and asthma were excluded.

Ethics:

We declare that the study was assessed and approved by the institutional ethics committee and that the letter of approval is available with us for examination.

Procedure:

Participants were screened using Perceived Stress scale, Anxiety self-rating scale and Neck disability index. Informed and signed consent was taken from participants prior to commencing the study. Pre readings were taken. Participants were randomly allocated in 2 groups, 15 in Group A and 15 in Group B respectively using chit method. Group A was given Sudarshan kriya and Group B was given 5 types of Pranayamas for 4 weeks 5 days a week for 30 minutes each day. Yoga mat was used for the procedure.

Before commencing the study, Certified Sudarshan Kriya Workshop was undertaken.

Group A:

Sudarshan Kriya yoga is derived from the yogic sciences of breath from Vedic texts. It includes gentle stretches (asanas), three stage

pranayam, bhastrika, chanting of "OM", Sudarshan Kriya (cyclical breathing) and meditation.

1. Asanas: It includes neck roll, shoulder rotation, peacock asana, swing, half-moon stretch, breath of joy, cat pose, butterfly pose, cradle pose, locust posture and mountain posture.
2. Three stage pranayam with "Ujjayi" or "Victorious Breath". This involves experiencing the conscious sensation of the breath touching the throat. This slow breath technique (2-4 breaths per minute) increases airway resistance during inspiration and expiration and controls airflow so that each phase of breath cycle can be prolonged to an exact count. The subjective experience is physical and mental calmness with alertness.
3. Bhastrika or "Bellow Breath", air is rapidly inhaled and forcefully exhaled at a rate of 30 breaths per minute. It causes excitation followed by calmness.
4. After bhastrika, "Om" is chanted three times using a prolonged expiration and 15 seconds rest after each chant.
5. Sudarshan Kriya: The next component is Sudarshan Kriya (or the healing of breath technique) a unique form of cyclic breathing (no pause between inspirations and expirations). No airway resistance is used. The inspiratory and expiratory phases are approximately equal.

Group B:

Do Pranayamas sitting in Sukhasana, the cross-legged position. Keep your back straight and your eyes closed. Think positive thoughts and focus on your breathing.

1. Anulom-vilom Pranayama

Also known as Nadi Shodhana (alternate nostril breathing) Close your eyes and sit in Padmasana. Use the right thumb to close the right nostril. Inhale slowly through the left nostril, taking in as much air as you can to fill your lungs. Remove the thumb from your right nostril and exhale. While exhaling, use the middle finger to close your left nostril and inhale with your right nostril. Remove the thumb from the right nostril and exhale.

Reps: Perform for 2-5 minutes

2. Bhramari Pranayama

Close your ears with your thumbs and place your index fingers on the temple. Close your eyes with the other three fingers. Gently inhale through the nose and hold for a few seconds. Keeping the mouth closed, exhale by making a humming sound.

Reps: 5 times

3. Ujjayi Pranayama

Begin by inhaling and exhaling naturally. Bend down your head, blocking the free flow of air, and inhale as long as you can, making a sound from your throat. Hold for 2-5 seconds. Close your right nostril with your right thumb while exhaling, and breathe out through the left nostril.

Reps: 10-12 times in as much time you need

4. Kapalabhati Pranayama

This breathing technique involves passive inhalation and active exhalation. So inhale normally, breathing in as much air as you can, and exhale forcefully. Try to pull your stomach muscles as closely as you can towards the backbone during exhalation.

Reps: Perform for 2-5 minutes

5. Bhastrika Pranayama

Take a deep breath in, inhaling as much air as you can, and expand your stomach. Exhale the air out with force and try to pull your navel in towards the backbone.

Reps: Repeat for 1-2 minutes and rest for a while afterward Post readings were taken and data was entered in Excel Spreadsheet.

Statistics:

SPSS software was used. sPaired t test was applied for within group analysis and Unpaired t test was applied for between group analysis. Level of significance (p) was kept 0.05 with 95% of confidence interval.

RESULTS:

Table 1:

Neck Disability Index within group analysis	Group A		Group B	
	Pre	Post	Pre	Post
Mean	21.8	14.5	21.2	18
SD	1.92	2.44	3.09	3.02
T	9.811		8.411	
p	<0.001		<0.001	

Table 2:

Neck Disability Index between group analysis	Group A	Group B
Mean Difference	7.33	3.2
SD	2.8	1.47
T	4.928	
p	<0.001	

Table 3:

Perceived Stress Scale within group analysis	Group A		Group B	
	Pre	Post	Pre	Post
Mean	22.8	16.6	22	19.4
SD	1.78	2.22	2.07	1.95
T	10.644		18.718	
p	<0.001		<0.001	

Table 4:

Perceived Stress scale between group analysis	Group A	Group B
Mean Difference	6.13	2.53
SD	2.23	1.125
T	5.578	
p	<0.001	

Table 5:

Hamilton Anxiety Scale within group analysis	Group A		Group B	
	Pre	Post	Pre	Post
Mean Difference	20.8	13.2	20.9	17.4
SD	1.82	2.85	1.94	1.76
T	14.266		11.309	
p	<0.001		<0.001	

Table 6:

Hamilton Anxiety Scale between group analysis	Group A	Group B
Mean Difference	7.6	3.4
SD	2.06	1.18
T	6.725	
p	<0.001	

DISCUSSION:

The aim of the study was to examine whether the effect of Sudarshan Kriya was superior to The 5 Pranayamas given individually in reducing neck pain, stress and anxiety. This study showed positive finding meaning the null hypothesis is rejected.

According to the Table 1, it was found that Neck pain was reduced in both the groups post intervention. Table 2 suggested that Sudarshan Kriya was better than the 5 Pranayamas given individually in reducing neck pain.

Study supporting this result was done by Nandini Vallath's in 2010 which suggests that pain has multiple dimensions. Beyond the nociceptive pathway, there is a hyperarousal state of the nervous system components, which negatively influences muscle tension, breathing patterns, energy levels, and mindset. All of this adds to the individual's distress and reduces his or her quality of life. Yoga eventually affects all aspects of a person's life, including vitality, mental, emotional, intellectual, and spiritual well-being. It provides various levels and approaches for relaxation, energy, remodeling, and strengthening of the body and mind. Pranayama balances the psychological system and triggers a 'relaxation response' in the neuroendocrine system. This includes a slower metabolism, quieter breathing, stable blood pressure, less muscle tension, a slower heart rate, and a slower brain wave pattern. As the neural discharge pattern is modulated, the nervous system's hyperarousal and the static load on postural muscles decrease.⁽⁷⁾ Another study done in 2009 by Eva Blozik et al, suggests that psychosocial factors are known to be highly linked with neck pain, so reducing stress and anxiety will result in less neck pain.⁽⁸⁾ Also, Richard P. Brown and Patricia L. Gerbarg conducted a study in 2005 which found that mind-body interventions are beneficial in stress-related mental and physical disorders. This

breathing technique is unique in its ability to balance the autonomic nervous system and influence stress-related disorders. Sudarshan kriya includes mechanisms such as increased parasympathetic drive, calming of stress response systems, neuroendocrine hormone release, and thalamic generators.⁽⁴⁾

According to the table 3, it was found that stress was reduced in both the groups post intervention. Table 4 suggested that Sudarshan Kriya was better than the 5 Pranayamas given individually in reducing stress. According to a 2018 study conducted by Maheshkumar Kuppusamy, continuous practice of Pranayama reduces dead space ventilation and reduces the work of breathing. In contrast to shallow breathing, which only refreshes the base of the lung, the entire lung is ventilated. This improves cardiovascular and respiratory functions while shifting the autonomic system toward parasympathetic dominance. As a result, the impact of stress and strain on various systems is reduced.⁽⁸⁾

Another study that backs up this finding was conducted in 2013 by Sameer A Zope et al., who discovered that blood lactate is another biochemical measure of stress. Lactate levels in the blood have been shown to rise in response to prolonged psychological stress. There was another significant drop in blood lactate after a session of SK. Sudarshan kriya can aid in emotional regulation and thus psychological well-being. The Sudarshan kriya literature states, "rather than allowing the emotions to alter the breath (and cause physiological changes which may prove unhealthy), one can skillfully use the breath to transform one's emotional state. According to scientific research on "Om" chanting, mental repetition of "Om" results in physiological alertness. Considering the positive impact of Sudarshan kriya on various psychosocial ailments, it is assumed that Sudarshan kriya can be a helpful in reducing stress."⁽⁹⁾

Also, according to a 2017 study conducted by Anjali Vagga et al, stress and depression lower the oxytocin hormone level while increasing cortisol¹⁷. Oxytocin is known to reduce stress caused by social separation and to aid in the formation of social bonds and affiliation. It is also suggested that Sudarshan kriya practices increase oxytocin levels, possibly through vagal nerve stimulation and other somato-sensory stimuli related to its breathing practices. Sudarshan kriya can aid in emotional regulation and thus psychological well-being.⁽⁶⁾ These might be the reasons to reduce stress in Group A.

Table 5 shows that anxiety was reduced in both the groups post intervention. While table 6 shows that Sudarshan Kriya was better than the 5 Pranayamas given individually in reducing anxiety.

According to a 2019 study by Gayathri Dilliraj et al., Pranayama stimulates both the sympathetic and parasympathetic nervous systems and aids in stress and anxiety relief. This can be justified by understanding the fundamental philosophy of pranayama.⁽¹⁰⁾ According to Azadeh Nemat's 2013 study, the purpose of yoga breathing exercise is to supply the body with oxygen while also cleansing it of carbon dioxide and other toxins. The presence of oxygen in the blood is essential for the body's various needs, such as tissue repair and energy supply. Stimulating the activity of the endocrine glands. Providing energy for the brain, nerves, heart, and other vital organs to function. Vital energies are distributed throughout the body. However, most people are unaware that the loss of energy/prana that is frequently felt in the body is primarily due to incorrect breathing. In general, one may only be using a small portion of one's lung capacity. Inadequate oxygen supply leads to improper waste disposal from the body. Because of a lack of energy, the body's functions slow down and cells/tissues fail to regenerate. Pranayama practice can increase oxygen intake by up to 5 times. This means that one can expel 5 times as much carbon dioxide from the body. Individuals who practiced Pranayama after the intervention reported less anxiety.⁽¹¹⁾

Sudarshan kriya has demonstrated significantly reduced anxiety scores, indicating stabilization of mental activity, enhanced brain function, and resiliency to stress.

According to a 2005 study conducted by Patricia L. Gerbarg, Yogic breathing is a unique method for balancing the autonomic nervous system and influencing psychologic and stress-related disorders. Many studies show that yogic breathing has an effect on brain function and physiologic parameters, but the mechanisms are unknown. Sudarshan Kriya yoga, a combination of the breathing techniques *ujjayi*, *bhastrika*, and *Sudarshan Kriya*, can help with anxiety,

depression, everyday stress, post-traumatic stress disorder, and stress-related medical illnesses.⁽¹²⁾

CONCLUSION:

The study concludes that Sudarshan kriya is more effective in reducing neck pain, stress and anxiety as compared to the 5 Pranayamas given individually. Duration of the day for session was not fixed was the limitation of the study. In future, study can be carried out in other population with different interventions.

REFERENCES:

1. Mofatteh M. Risk factors associated with stress, anxiety, and depression among university undergraduate students. *AIMS Public Health*. 2021;8(1):36.
2. Mutalik NR, Moni S, Choudhari SB, Bhogale GS. Depression, anxiety, stress among college students in Bagalkot: A college-based study. *life*. 2016; 9:10.
3. Blozik E, Laptinskaya D, Hermann-Lingen C, Schaefer H, Kochen MM, Himmel W, Scherer M. Depression and anxiety as major determinants of neck pain: a cross-sectional study in general practice. *BMC musculoskeletal disorders*. 2009 Dec;10(1):1-8.
4. Brown RP, Gerbarg PL. Sudarshan Kriya Yoga Breathing in the treatment of stress, anxiety, and depression: Part I—Neurophysiological model. *J Complement Altern Med* 2005;11: 189–201.
5. Ramón-Arbués E, Gea-Caballero V, Granada-López JM, Juárez-Vela R, Pellicer-García B, Antón-Solanas I. The prevalence of depression, anxiety and stress and their associated factors in college students. *International Journal of Environmental Research and Public Health*. 2020 Jan;17(19):7001.
6. Anjali vagga, dr. N. R. Akarte: Sudarshan Kriya A Novel Breathing Technique. *International Journal of Anatomy, Physiology and Biochemistry*. 2017 July; 4(7):7-14
7. Vallath N. Perspectives on yoga inputs in the management of chronic pain. *Indian J Palliat Care*. 2010 Jan;16(1):1-7. doi: 10.4103/0973-1075.63127. PMID: 20859464; PMCID: PMC2936076.
8. Maheshkumar Kuppusamy, Dilara Kamaldeen, Ravishankar Pitani, Julius Amaldas, Poonguzhali Shanmugam,
9. Zope SA, Zope RA. Sudarshan kriya yoga: Breathing for health. *Int J Yoga* 2013;6:4-10.
10. Effect of pranayama on stress in doctors Gayathri Dilliraj¹, Harini Kannan², B. Shanthi³ 1,2 Tutor, 3 Head, Department of Biochemistry, Sree Balaji Medical College & Hospital, Chrompet, Chennai- 44, Tamilnadu (Received: September 2019 Revised: December 2019 Accepted: January 2020)
11. : Nemat A. The effect of pranayama on test anxiety and test performance. *Int J Yoga* 2013;6:55-60.
12. Brown, Richard & Gerbarg, Patricia. (2005). *Sudarshan Kriya Yogic Breathing in the Treatment of Stress, Anxiety, and Depression: Part II—Clinical Applications and Guidelines*. Journal of alternative and complementary medicine (New York, N.Y.). 11. 711-7. 10.1089/acm.2005.11.71