

VOLUME 9

ISSUE 2

2023

ISSN 2454 – 3055



**INTERNATIONAL
JOURNAL OF
ZOOLOGICAL
INVESTIGATIONS**

***Forum for Biological and
Environmental Sciences***

Published by Saran Publications, India



International Journal of Zoological Investigations

Contents available at Journals Home Page: www.ijzi.net

Editor-in-Chief: Prof. Ajai Kumar Srivastav

Published by: Saran Publications, Gorakhpur, India



ISSN: 2454-3055

Importance of a Yoga Course to Manage Hypoxia in Individuals

Naga Kishore R.*, Ravi Kumar M., Anjaneyulu N., Bharat Bhushan M. and Abhinayani G.

Geethanjali College of Pharmacy, Cheeryal (V), Keesara (M), Medchal Dist, Telangana 501301, India

*Corresponding Author

Received: 28th September, 2023; Accepted: 9th November, 2023; Published online: 7th December, 2023

<https://doi.org/10.33745/ijzi.2023.v09i02.139>

Abstract: Yoga is an art, a science, and a philosophy that was developed in India over 5000 years ago but now draws on a variety of spiritual precepts, practices, and ideas. An evaluation of the current yoga course revealed that, out of the more than 60 yogic activities, 16 and 17 were found to increase oxygen saturation and improve lung capacity, while 19 were determined to be helpful in both areas. The current study is a useful module for treating people with respiratory issues and hypoxia. However, more study is required to determine the viability and effectiveness of the module.

Keywords: Yoga therapy, Asanas, Lung capacity, Hypoxia

Citation: Naga Kishore R., Ravi Kumar M., Anjaneyulu N., Bharat Bhushan M. and Abhinayani G.: Importance of a yoga course to manage hypoxia in individuals. Intern. J. Zool. Invest. 9(2): 1239-1245, 2023.

<https://doi.org/10.33745/ijzi.2023.v09i02.139>



This is an Open Access Article licensed under a Creative Commons License: Attribution 4.0 International (CC-BY). It allows unrestricted use of articles in any medium, reproduction and distribution by providing adequate credit to the author (s) and the source of publication.

Introduction

Yoga, which has its roots in Indian philosophy and spirituality, is regarded as a method for reaching the unity of the mind, body, and spirit (Feuerstein, 1998). Nonetheless, regardless of style, yoga incorporates particular physical postures (asana), breathing methods (pranayama), meditation techniques (dhyana), and philosophy. Yoga has gained popularity as a discipline that improves wellbeing and is used to prevent and treat medical issues. Yoga is a holistic practice that is easily modified to fit each person's unique physical needs and has the potential to be used as a therapeutic intervention. The specifics of how a

yoga practice (and all of its interconnected parts) affects one's health are still being investigated (Raub, 2002).

Yoga is an art, a science, and a philosophy that draws from a collection of spiritual principles, precepts, and practices that were created in India some 5000 years ago. It is a sophisticated intervention that combines physical exercise, breathing exercises, meditation, and theoretical underpinnings that could affect attitudes, beliefs, and interpersonal interactions (McCall *et al.*, 2013). Yogic practice has becoming increasingly popular all over the world (Cramer *et al.*, 2016).

According to reports, 21 million Americans engaged in yoga between 2016 and 2017 (Ding and Stamatakis, 2014). According to the study, participants had a higher likelihood of being female, younger, non-Hispanic white, college educated, higher income, living in the West, and having a better health status (Cramer *et al.*, 2016). Similar demographic traits apply to yoga practitioners in both England and Germany, with college-educated females from upper socioeconomic levels typically attending sessions. 15.7 million people are actively practicing yoga or are at least interested in starting to practice in Germany, according to estimates (Cramer *et al.*, 2018).

According to survey findings, participants in the general population started practicing yoga for health and fitness but kept doing so for stress relief. One in five of the 2567 respondents said they practiced yoga for a specific health or medical issue that they felt the practice had improved (Bennett *et al.*, 2012). According to the poll, asana (yoga postures) and vinyasa (a series of postures combining breath and movement) accounted for around 61% of practice time, with the remainder being spent on meditation, relaxation, and pranayama (breathing exercises).

More lately, medical professionals have begun to accept yoga as a complementary therapy and use it to cure patients' illnesses and ailments (Garfinkel, 2006).

Yoga is a mind-body therapy that has several advantages. It has gained popularity as a stand-alone practice and as an adjunct to treatment for the self-initiated self-management of a variety of chronic health issues. Numerous physical health issues, including neck pain, low back pain, irritable bowel syndrome, HIV/AIDS, high blood pressure, and type 2 diabetes mellitus, have been shown to be improved by yoga (Jayawardena *et al.*, 2018; Dunne *et al.*, 2019).

According to a study of 81 research that compared yoga therapies to exercise control groups in adults, yoga was equally as effective as

or even more effective than traditional exercise at reducing blood sugar, blood lipids, cortisol, and oxidative stress. Yoga is a promising therapeutic intervention, but more research is needed to determine exactly how yoga practice affects one's health. According to one theory, asana relaxes the mind and/or the body by activating neurohormonal processes and reducing sympathetic activity, yoga enhances autonomic functions. It is believed that yoga's effects on hormone regulation, notably cortisol levels, are linked to a reduction in perceived stress, a reduction in anxiety, an increase in emotions of wellbeing, and an improvement in pain management (Sengupta, 2012).

The effects of breathing exercises and meditation (combined with the physical asanas that lower sympathetic activation) regulate the hypothalamic-pituitary-adrenal axis to improve outcomes in mood disorders and stress, enhance well-being, and lower anxiety. Breathing is frequently cited as a powerful skill in which relaxation is accomplished, which in turn empowers people to control their own stress (Pascoe and Bauer, 2015). Yoga breathing has allegedly been discovered to alter cognition function, autonomic function, and pulmonary function in addition to the body's metabolic processes. Studies revealed the breath modulation as either critical or very important for the management of anxiety and depression. Uncertainty surrounds the precise mechanism(s) via which advantages to mental health occur. Any beneficial consequence is probably subject to a variety of influences, including asana, pranayama, meditation, mindfulness, and the spiritual components of yoga.

It is usually known as adapted yoga, adaptive yoga, or accessible yoga when yoga is provided for individuals who have a disability or a chronic disease and involves modified asana. These words are used to show the user that yoga poses have been altered to make them accessible for people who are physically or cognitively disabled. In Australia, the practice of modifying yoga for

people with disabilities is quite new, and there is not yet a name for it that everyone agrees on.

The recent expansion of studies in this field made it clear that a review of the literature on yoga and disability was necessary. From a medical standpoint, research into the intricacies of a yoga practice and its consequences is still in its early stages. Yoga, regardless of its form, combines particular physical postures (asana), breathing techniques (pranayama), and meditation methods (dhyana) to achieve balance, health, and relaxation by enhancing strength, flexibility, and mindfulness. The best way to describe asana is as a collection of physical positions that participants must hold while bending, standing, twisting, and maintaining balance in order to increase flexibility and strength. Pranayama is the regulated exercise method of conscious breathing that emphasizes the inhalation, expiration, or retention of breath. It frequently focuses on mindfulness and bodily awareness. Using mental processes made up of pondering techniques, meditation fosters and develops focus, clarity, and emotional positivity.

Yoga is a form of mind-body exercise that combines improved blood flow to the muscles, breathing awareness, and awareness of oneself and one's energies. Yoga has been discovered to be a useful training tool when combined with other methods. Yoga is different from other common types of exercise training since it calls for multi-structural participation, which challenges the body in a number of different ways. The locomotor system, cardiovascular system, neurological system, and endocrine system are the four major systems of the human body that are positively impacted by yogic activities like asana and pranayama. The basis for yoga's psychological and physiological impacts is the integration of control over the body, breath, and thoughts.

Numerous studies have been done on improving hypocoagulability, muscular endurance, hand-grip strength, flexibility, balance, maximum work output, forced vital capacity and body fat reduction. Yoga practice also improves physiological aspects of a person's performance,

including their anaerobic, aerobic, and cardiovascular endurance. Yoga intervention increases a person's mental fatigue threshold and may lessen the frequency of accidents brought on by poor balance. It also enhances lower extremity functions, the landing mechanism, and both dynamic and semi-dynamic balance. Yoga activities have been shown to improve cognitive processes like learning, alertness, memory, concentration, attention, perceptual efficiency, and reaction time. Yoga also improves emotional wellness and mood state.

A significant increase in plasma fibrinolytic activity, along with a decrease in fibrinogen, a protracted activated partial thromboplastin time and platelet aggregation time, an increase in blood and plasma platelets, and a significant elevation of haemoglobin and the haematocrit are changes in blood coagulation parameters that can be brought about by yoga. Studies imply that practicing yoga causes the blood to become less coagulable. It is clear that yoga has a positive effect on preventing thrombotic and cardiovascular diseases (Chohan *et al.*, 1984).

Cardiovascular disease patients may perform worse if they are fatigued since it affects their skills and coordination. The precision and coordination suffer from muscle exhaustion. As tiredness worsened, daily activities reduced and function was compromised. Cardiovascular patients may manifest a variety of physical and physiological symptoms, including hypoxia, atherosclerosis, chest pain, muscle fatigue, loss of appetite, weight loss, a weak immune system, an imbalance between the parasympathetic and sympathetic nervous systems, a reduction in the ability to store energy, tissue damage, elevated resting heart rates, muscle damage, inflammation, and a reduction in the ability to exert maximum power (Schober, 2018).

So far there is no proper scientific validity for the said yoga course for the validation of hypoxia as well lung capacity. An especially created yoga curriculum that incorporates asana poses with readings from ancient yogic scriptures and

intellectual study. It was designed with the goal of offering an efficient and workable solution while considering the physical needs, physiological profile, psychological skills, and all other psycho physiological hurdles that individuals with issues confront in daily activities.

Materials and Methods

The preliminary yoga course comprised of more than 60 yoga practices screened from more than 100 practices, such as Om meditation; Yoga Nidra; Vrikshasana; Tuladharasana; Nauli; Shahmru-gasana; Markatasana; Vaman Dhauti; Sutra Neti; Ardha Matsyendrasana; Padahastasana; Bhadrasana; Ardha kati Chakrasana; Matsyasana; Marjariasana; Shasankasana; Pawanmuktasana Kriya; Dog Breathing; Jogging (Slow Jogging, Forward Jogging, Backward Jogging, Side Wise Jogging); Forward and Backward Bending; Side Bending, Twisting; Greevasanchalana (Neck Movements); Scandasanchalan (Shoulder Movements); Katisanchalana (Waist Movements); Hands in & out breathing; Hands Stretch Breathing; Ankle Stretch Breathing; Tiger Breathing; Straight leg Raise Breathing; Nadishuddhi Pranayama; Bhastrika; Bhramari; Cyclic meditation; Shavasana; Sarvangasana; Setubandhasana; Veerabhadrasana; Halasana; Shalabhasana; Utthanpadasana; Sheetkari; Mayurasana; Utthana; Koormasana; Makrasana Koormasana Matsyendrasana; Kukkutasana Bakasana Shitali; Konasana; Gandirasana; Tadasana; Ujjayi; Dandasana; Natarajasana; Malasana; Adho Mukha Shvanasana; Shulinasana; Rabbit Breathing; Shasankasana Breathing; Tadasana (Mountain pose); Vrikshasana (Tree pose); Setu Bandhasana (Bridge pose); Salamba Sarvangasana (Half shoulder stand pose); Bhujangasana (Cobra pose); Dhanurasana (Bow pose); Utthita Hastapadasana (Extended hands and feet pose); Adho Mukho Svanasana (Downward facing dog pose); Trikonasana (Triangle pose); Marjariasana (Cat pose); Veerabhadrasana (Warrior pose); Utkatasana (Chair pose); Ardha Matsyendrasana (Sitting half spinal twist pose); Salamba Bhujangasana (Sphinx pose); Anjali

Mudra (Salutation seal); Shavasana (Corpse pose); Makara Adho Mukha Svanasana (Dolphin plank pose); Ardha Pincha Mayurasana (Dolphin pose); Paschimottanasana (Two legged forward bend pose) etc.,

Inclusion and Exclusion criteria:

Subject experts (SE) with clinical experience include yoga doctors of medicine, yoga doctors with at least five years of experience, and yoga therapists with master's degrees (MSc Yoga) and at least seven years of post-secondary work experience. Yoga therapists with less than seven years of experience and doctors with fewer than five years of experience will be disqualified. Individuals with low lung volume capacities (<6 litres) and Oxygen saturation (SPO₂) with 92-93 were considered for the study.

Pulmonary Cardiovascular System Examinations:

Oxypulsimeters are used to evaluate hypoxia, while spirometer, one can determine lung capacity. The outcomes are all contrasted with the control.

Data extraction and Analysis:

We developed a yoga module for the treatment of hypoxia, and we successfully tested it for a period of 21 days on a small group of six healthy volunteers to see how the oxygen levels in their blood improved. Our important findings demonstrated that the most effective yoga poses help manage hypoxia and improvement in lung volume. Further research is necessary to verify the validity of the findings with a large sample size of participants. For the yoga course's therapy of cardiovascular issues such as hypoxia, atherosclerosis, ischemia, and myocarditis, among others, the factors such as lung volume determination by spirometer and oxygen carrying capacity determination were examined.

Results and Discussion

The constructed yoga course for individuals contain more than 60 yoga practices and it has been validated by experts. A significant increase in lung volume capacities (<6 litres) and Oxygen

saturation (SPO₂ above 98%) parameters were brought about by yoga course. Adho Mukha Shvanasana, Bakasana shitali, Bhadrasana, Chaturanga dandasana, Dhanurasana, Greevasanchalana, Malasana, Nauli, Pawanmuktasana kriya, Samasthiti, Shavasana, Sheetkari, Shulinasana, Sutra Neti, Vrikshasana and Yoga Nidra were found to raise oxygen saturation. Ardha kati chakrasana, Ardha matsyendrasana, Ardha pincha mayurasana, Balasana, Padahastanasana, Salamba bhujangasana, Scandasanchalan, Setu bandhasana, Shahmrugasana, Shalabhasana, Shasankasana, Tadasana, Trikonasana, Tuladharasana, Utkatasana, Utthanpadasana and Utthita hastapadasana improvement in lung capacity. Whereas Bhastrika, Bhramari, Dog Breathing, Jogging, Koormasana, Kukkutasana, Makara Adho Mukha Svanasana, Makrasana, Marjariasana Markatasana, Matsyasana, Mayurasana, Nadishuddhi Pranayama, Natarajasana Om meditation, Urdhva hastasana, Urdhva mukha svanasana, Urdvah uttanasana and Vaman dhauti were found to be effective in both parameters (Table 1).

It has lately been employed clinically as a therapeutic intervention to improve someone's physical, mental, and emotional wellbeing and restore equilibrium. Over the years, schools and teachers of yoga have held a variety of beliefs and traditions, and the general public can choose from a wide range of yoga styles with various theoretical frameworks. Yoga has come to be associated with physical activity in Western culture, but its original purpose was to promote service, devotion, and intellectual foresight in order to achieve enlightenment or a higher state of consciousness. The Sanskrit term "yoga" has a wide range of meanings, but according to etymology, it comes from the verbal root "yuj," which can mean "to tie," "to yoke," "to unite," "to unionize," "to join," and other things. Yoga is described as "samatva" in the Bhagavad Gita, a classic 700-verse Hindu literature that means "equanimity," "harmony," and "balance".

Among the 108 Upanishads, the Yoga-Kundalini Upanishad is the eighty-sixth. It is a component of Krishna Yajurveda. An explanation of Hatha and Lambika Yogas is included. Prana control techniques are presented in the Yoga-Kundalini Upanishad. With Vasanas, the Yogic pupil does not deal. His main area of interest is Prana control methods. According to the Upanishads, Sarvangasana develops the thyroid gland, fortifies the lungs and the heart, and makes the spine elastic. Sirshasana develops the brain, bestows a strong memory, and enhances eyesight and hearing capacity through increased blood circulation in the brain box. As the mind gets purer, it rises to the Anahata Chakra, which is located in the center of the heart, feels joy, and sees the tutelary deity's effulgent form. The Svadhishthana Chakra, Manipura Chakra in the navel, Anahata Chakra in the heart, Vishuddha Chakra in the throat, and Ajna Chakra between the eyebrows, or the Trikuti, should all be crossed by the Kundalini.

The Yoga Sutras, the Bhagavad Gita, the Vedas, and the Shiva Samhita are ancient works that outline the fundamentals of yoga, the behavior of its practitioners, and the yogic condition. The majority of the information was transmitted orally from teacher to pupil over a long period of time. Perhaps the most significant and authoritative figure in the development and history of yoga is Patanjali. His collection of sutras, or short sayings, captures the essence of yoga and explains its purpose and methodology.

The eight limbs (or phases) of yoga, which provide concrete guidelines for yoga students to follow are described by Patanjali in the Yoga Sutras. These are: yama (discipline), niyama (restraint), asana (posture), pranayama (breath control), pratyahara (sensation withdrawal), dharana (concentration), dhyana (meditation), and ecstasy (ecstasy) (samadhi).

Asana is described as a steady, pleasant position in Patanjali's Yoga Sutras. This third limb creates "mental homeostasis" by bringing "steadiness, health, and lightness". They use

Table 1: Effect of yoga asana in raising oxygen saturation and improvement in lung capacity

Raised Oxygen saturation	Improvement in Lung capacity	Both Improvement in lung capacity and oxygen saturation
Adho Mukha Shvanasana	Ardha kati Chakrasana	Bhastrika
Bakasana Shitali	Ardha Matsyendrasana	Bhramari
Bhadrasana	Ardha Pincha Mayurasana	Dog Breathing
Chaturanga dandasana	Balasana	Jogging
Dhanurasana	Padahasthasana	Koormasana
Greevasanchalana	Salamba Bhujangasana	Kukkutasana
Malasana	Scandasanchalan	Makara Adho Mukha Svanasana
Nauli	Setu Bandhasana	Makrasana
Pawanmuktasana Kriya	Shahmrugasana	Marjariasana
Samasthiti	Shalabhasana	Markatasana
Shavasana	Shasankasana	Matsyasana
Sheetkari	Tadasana	Mayurasana
Shulinasana	Trikonasana	Nadishuddhi Pranayama
Sutra Neti	Tuladharasana	Natarajasana
Vrikshasana	Utkatasana	Om meditation
Yoga Nidra	Utthanpadasana	Urdhva hastasana
	Utthita Hastapadasana	Urdhva mukha svanasana
		Urdvah uttanasana
		Vaman Dhauti

physical positioning of the body in order to foster awareness, relaxation, focus, and meditation. At any given time, an asana may call for one or more movements, either sequentially or simultaneously.

While asana involves moving the body and breathing well while performing the positions, pranayama is solely concerned with controlling the breath. It is capable of standing alone as a discipline. Inhalation, exhalation, internal breath retention, and outward breath retention are the four components of pranayama. By exercising the respiratory system's muscles consistently and for a longer period of time, pranayama develops their endurance and strength. It improves the autonomic system's vagal tone dominance and favorably affects cardiovascular and respiratory processes.

Asana helps in strengthen lungs, thorax,

abdomen muscles and also improves body balance. Increased energy, intelligence, reduced insomnia, reduced anxiety, improved overall health, and improved creativity are among the benefits of meditation. By meditating, oxidative stress and the hormone-stressor interaction rate are all lowered which facilitates increased oxygen supply to the tissue.

Conclusion

Current module has been validated by yoga experts and it showed that amidst the more than 60 yogic practices, 16 and 17 were found to raise oxygen saturation and improvement in lung capacity whereas 19 were found to be effective in both. The present course is a valid module in the management of hypoxia and respiratory problems for individuals. However, further research is needed to investigate the efficacy and feasibility of

the developed module.

References

- Bennett C, Vakil N, Bergman J, Harrison R, Odze R, Vieth M, Sanders S, Gay L, Pech O, Longcroft-Wheaton G, Romero Y, Inadomi J, Tack J, Corley DA, Manner H, Green S, Al Dulaimi D, Ali H, Allum B, Anderson M, Curtis H, Falk G, Fennerty MB, Fullarton G, Krishnadath K, Meltzer SJ, Armstrong D, Ganz R, Cengia G, Goings JJ, Goldblum J, Gordon C, Grabsch H, Haigh C, Hongo M, Johnston D, Forbes-Young R, Kay E, Kaye P, Lerut T, Lovat LB, Lundell L, Mairs P, Shimoda T, Spechler S, Sontag S, Malfertheiner P, Murray I, Nanji M, Poller D, Ragunath K, Regula J, Cestari R, Shepherd N, Singh R, Stein HJ, Talley NJ, Galmiche JP, Tham TC, Watson P, Yerian L, Rugge M, Rice TW, Hart J, Gittens S, Hewin D, Hochberger J, Kahrilas P, Preston S, Sampliner R, Sharma P, Stuart R, Wang K, Waxman I, Abley C, Loft D, Penman I, Shaheen NJ, Chak A, Davies G, Dunn L, Falck-Ytter Y, Decaestecker J, Bhandari P, Ell C, Griffin SM, Attwood S, Barr H, Allen J, Ferguson MK, Moayyedi P and Jankowski JA. (2012) Consensus statements for management of Barrett's dysplasia and early-stage esophageal adenocarcinoma, based on a Delphi process. *Gastroenterology* 143(2): 336-346.
- Chohan IS, Nayar HS, Thomas P and Geetha NS. (1984) Influence of yoga on blood coagulation. *Thrombosis Haemostasis* 51(2): 196-197.
- Cramer H, Lauche R, Anheyer D, Pilkington K, de Manincor M, Dobos G and Ward L. (2018) Yoga for anxiety: A systematic review and meta-analysis of randomized controlled trials. *Depression Anxiety* 35(9): 830-843.
- Cramer H, Lauche R, Langhorst J and Dobos G. (2016) Is one yoga style better than another? A systematic review of associations of yoga style and conclusions in randomized yoga trials. *Complement Therapies Med* 25: 178-187.
- Cramer H, Ward L, Steel A, Lauche R, Dobos G and Zhang Y. (2016) Prevalence, patterns, and predictors of yoga use: results of a US nationally representative survey. *American J Preventive Med* 50(2): 230-235.
- Ding D and Stamatakis E. (2014) Yoga practice in England 1997-2008: prevalence, temporal trends, and correlates of participation. *BMC Res Notes* 7(1): 1-4.
- Dunne EM, Balletto BL, Donahue ML, Feulner MM, DeCosta J, Cruess DG, Salmoirago-Blotcher E, Wing RR, Carey MP and Scott-Sheldon LAJ. (2019) The benefits of yoga for people living with HIV/AIDS: A systematic review and meta-analysis. *Complement Ther Clin Pract* 34:157-164.
- Feuerstein G. (1998) *Tantra: Path of ecstasy*. Shambhala Publications.
- Garfinkel M. (2006) Yoga as a complementary therapy. *Geriatrics Aging* 9(3): 190-194.
- Jayawardena R, Ranasinghe P, Chathuranga T, Atapattu PM and Misra A. (2018) The benefits of yoga practice compared to physical exercise in the management of type 2 Diabetes Mellitus: A systematic review and meta-analysis. *Diabetes Metabolic Syndrome Clin Res Rev* 12(5): 795-805.
- McCall MC, Ward A, Roberts NW and Heneghan C. (2013) Overview of systematic reviews: yoga as a therapeutic intervention for adults with acute and chronic health conditions. *Evid Based Complement Alternat Med* 2013: 945895.
- Pascoe MC and Bauer IE. (2015) A systematic review of randomised control trials on the effects of yoga on stress measures and mood. *J Psychiatric Res* 68: 270-282.
- Raub JA. (2002) Psychophysiologic effects of Hatha Yoga on musculoskeletal and cardiopulmonary function: a literature review. *J Alternat Complement Med* 8(6): 797-812.
- Schober PD. (2018) *The Introduction of Yoga Recovery on Physiological and Psychological Stress and Performance in NCAA Athletes*. Graduate Student Theses, Dissertations, Professional Papers. 11141. <https://scholarworks.umn.edu/etd/11141>.
- Sengupta P. (2012) Health impacts of yoga and pranayama: A state-of-the-art review. *Int J Preventive Med* 3(7): 444.