

Therapeutic Efficacy of Yoga in Non-Communicable Diseases

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ABSTRACT

Yoga, which originated in India 5000 years ago, helps the human beings to make their body healthy. *Yoga* is an essential practice to increase the physical and mental activity and prevent the occurrence of Non-Communicable Diseases. *Yoga* practice can improve the function of different system of the body, foster psychological wellbeing and improve the oxygen delivery to tissue, remove the metabolic waste product, carcinogens and cellular toxin and scientific evidence has begun to emphasize its efficacy. It helps to get rid of toxic substances which create disturbances in the body. In this review, the authors explain the role of various *yoga* practices in the management of four major Non-Communicable Diseases i.e. Diabetes Mellitus, Respiratory Disorders, Cardiovascular Diseases and Cancer based on evidences from various literatures and research and review articles.

KEY WORDS Cancer, Cardiovascular diseases, Diabetes mellitus, Non-Communicable Diseases, Respiratory diseases

1. INTRODUCTION

Non-Communicable Diseases (NCD) is the ailments that are based on the routine habits of people. Sedentary lifestyle is the leading cause for health issues which leads to Non - Communicable Diseases. As per WHO, mortality rate due to Non - communicable diseases was 41 million people each year globally. Out of that, 15 million death occurs in the age group of 30 to 69 years. 17.9 million people annually die due to cardiovascular diseases, 9.0 million people due to cancers, 3.9 million people due to respiratory diseases and 1.6 million people due to diabetes. The four Non-communicable diseases cause 80% of Premature deaths.^[1]

According to WHO, prevalence of various risk factors increases the burden of NCDs globally, which can be controlled through *Yoga* Practices. *Yoga* has been practiced more than 5,000 years in India. It aims at balancing the body and mind. The

name *Yoga* originates from the Sanskrit word 'Yuj' meaning to bind and join. *Yoga* helps the human being to make his body healthy and fit. It helps the man to get rid of toxic substances which create disturbances in the body. *Rishi Patanjali*, Father of *yoga* describes the eight stages (*AstangaYogam*) of *yoga* in his "*Yoga Sutras*". They are *Iyamam*, *Niyamam*, *Aasanam*, *Pranayamam*, *Pratyaharam*, *Dharana*, *Dhyanam* and *Samadhi*. As told in WHO's Global action plan on physical activity 2018- 2030, the routine practice of *yoga* is essential to maintain the healthy life of the people. To reduce NCD-related premature mortality, regular practice of *yoga* must be implemented.^[2] In this short review, we discuss the various role of *yoga* practices for the management of four major Non-Communicable Diseases based on documentation from literatures and research and review articles.

2. BENEFITS OF YOGA

Practicing *yoga*, increases longevity, activates the heart, lungs and strengthens the various organs of the human body by regulating the blood circulation and keeps one always very active and young. It removes the unwanted flabby muscle and removes lethargy and tiredness. *Yoga* practices strengthen the brain, improve the memory power and adds charm to one's face. It helps in managing the five senses by giving peace to mind thus make one's life healthy without any disease.^[3]

3. RULES TO BE FOLLOWED BEFORE COMMENCING YOGA PRACTICE

Place: *Yoga* should be done in airy hygienic place, insect-free and calm. *Asanam* should not be done on the uncovered floor or an uneven place. It should be done on a blanket laid on the even floor.^[3]

Time: The best time to practice is either early morning or late in the evening.^[3]

Sun: Do not practice *asanam* after being out in the hot sun for several hours.^[3]

Bath: More the physical exercises, more will be the sweating. Therefore, usually after physical exercises people take bath. But the *yoga* and physical exercises are different and so taking a bath before the *asanam* practice is must.^[3]

Cleansing: Before starting the *yoga*, the urinary bladder must be emptied, and the bowels should be evacuated.^[3]

Food: *Yoga* should be preferably done in an empty stomach. Food can be taken half an hour after completing *yoga* practice.^[3]

Dress: Dress should be elastic around the waist and it should not be tight.^[3]

YOGA FOR DIABETES MELLITUS

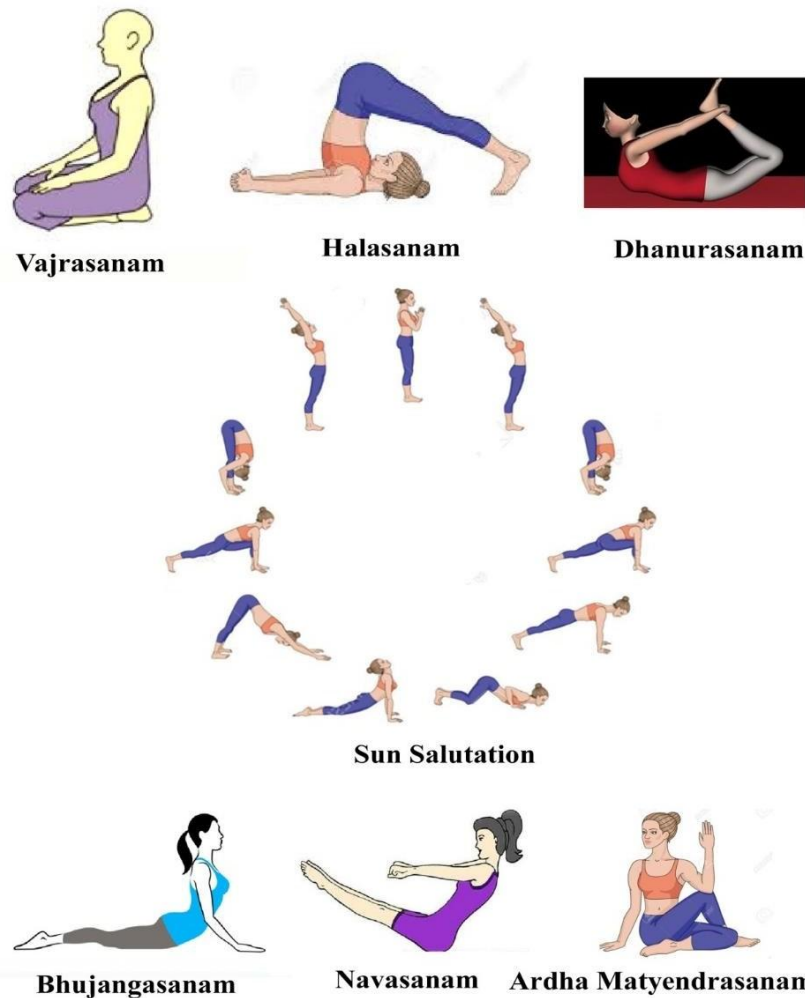
3.1 Surya Namaskar (Sun Salutation)

Surya namaskar involves a series of *yoga* postures which will be performed in a specific sequence. *Surya namaskar* performed in a brisk way increases cellular requirements for oxygen and glucose. To meet these requirements, insulin production is stimulated through brain signaling.^[4] *Asana* experiment consisting of 25 minutes of *Surya namaskar* along with other *asanas* and relaxation technique in perimenopausal women resulted in a notable reduction in diastolic blood pressure and waist circumference, and positive effects on glycemic outcomes.^[5]

3.2 Asanas

Asanas emphasize the relationship of body, mind, and emotions and pay attention on the synchronization of breathing and movement. They involve stretching movements and relaxation. The key to do a *yoga* posture is that it should be performed with stability and comfort. *Asanas* had a beneficial effect on glucose utilization and fat redistribution in people with type 2 diabetes.^[6] In patients with diabetes, the pancreatic cells may be rejuvenated and β -cell sensitivity in the pancreas may be increased by the alternate abdominal contractions and relaxations involved in *yoga* practice. Improved blood supply to muscles may enhance insulin receptor expression in the muscles, causing increased glucose uptake.^[7] It was noticed that ideal control of diabetes was reached by practicing *dhanuraasanam* and *ardhamatyendraasanam*. *Halaasanam*, *vajraasanam*, *bhujangaasanam*, and *naukaasanam* were also found to be powerful.^[8] Some of the *yoga* postures for Diabetes mellitus is given in Figure 1.

Figure 1 Yoga for Diabetes Mellitus



4. YOGA FOR RESPIRATORY DISEASES

The practice of *Yoga* exhibits a powerful effect on the respiratory system, the greatest advantage may come from the efficient practice of *Pranayamam*. Certain *yoga postures* are also found to be useful by exhibiting direct or indirect effects on the respiratory organs. *Yoga postures* involve an isometric contraction which strengthens the skeletal muscle.^[9]

4.1 Pranayamam

The regular practice of *pranayamam* will lead to good supply of the oxygen to the lungs. Respiratory rate becomes slower. This slower breathing will activate the para sympathetic

nervous system which helps in reducing stress and rejuvenating the body. It strengthens the diaphragm and removes impurities from the breathing tube.^[10]

4.2 Asanas

Some *Yoga postures* like Backbends, standing poses, *asanas* in which the arms are extended overhead will stretch and create space around the chest and abdominal areas thus benefiting the lungs, diaphragm, and accessory muscles of respiration. Some of the beneficial posture include *bhujangaasanam*, *viparita dandaasanam*, *dwipadavipar tadandaasanam*, *urdhvamukhasvana asanam*, *ustrasana*, *supta viraasanaurdhva dhanuraasanam*, *setu bhanda sarvangaasanam*,

paryankaasanam, *virabhadraasanam* and *utthita trikonaasanam*.^[11]

Lungs and other respiratory organs require an adequate fresh and healthy blood to prevent disorder and disease. This is obtained by way of gravity, i.e. inverted postures, and through the method of "squeezing and soaking". In inverted poses such as *sirsaasanam*, *salabaasanam*, *sarvangaasanam*, *halaasanam*, *setu banda sarvangaasanam* and *viparitarani*, circulation throughout the human body is altered and areas above the heart receive an increased supply of blood. It should also be noted that the last two postures mentioned also have the additional respiratory benefit of stretching and massaging the diaphragm, the primary muscle of respiration. The process of "squeezing and soaking" occurs when a respiratory organ is constricted and released.^[11] Some of the *yoga* posture for respiratory diseases are given in Figure 2.

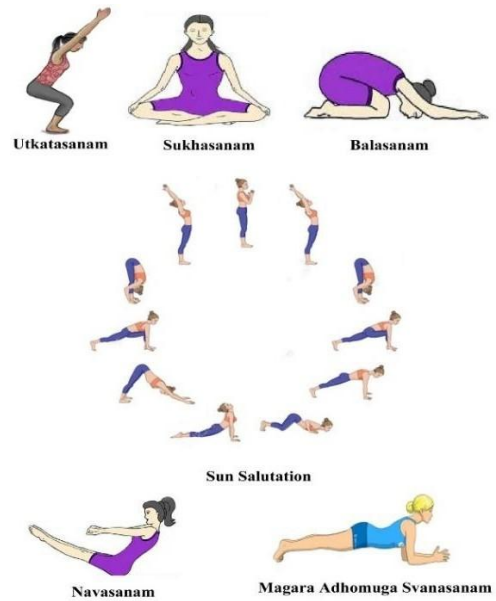
Figure 2. Yoga for Respiratory Diseases



5. YOGA FOR CARDIOVASCULARDISEASES (CVD)

In their study explained that yoga is beneficial for CVD.^[12-14] Regular practice of *yoga* results in an improvement in lipid profiles^[13], heart rate variability^[15], decrease in blood pressure^[14] and even regression of atherosclerosis when combined with proper diet and lifestyle modifications ^[16,17]. Meditative poses can also reduce potentially artery-clogging stress hormones. Examples of such poses are like *Sukhasanam* (Easy Pose) or Child's Pose (*Balaasanam*). These poses also contribute to mind-body awareness that impacts lifestyle choices, such as mindful eating and knowing when to remove you from stressful situations.^[18] Poses like *Utkataasanam*, *Navaasanam* and Dolphin Plank pose work your heart while they develop core strength.^[18] Flowing yoga poses, such as Sun Salutation, increase the heart rate, thereby reducing the resting heart rate. This helps the heart to pump the blood it needs to the rest of the body efficiently. ^[18] Some of the *yoga* postures for cardiovascular diseases are given in Figure3.

Figure 3. Yoga for Cardiovascular Diseases



6. YOGA FOR CANCER

The *asanas* and *pranayamam* together help keep the mind calm and prepare the mind to overcome sensory stimulus, reduce the thoughts by helping one to focus and concentrate.

Yoga has been used to control symptoms such as fatigue, sleep disturbances, loss of appetite, chemotherapy- induced nausea and vomiting (CINV), and pain in cancer patients.^[19,20] The effects of *yoga* intervention have been moderate to large in these studies. Cooling *Pranayamam* have been useful in managing CINV along with *pavanamuktaasanam* (supine knee-chest) and *uttanapadaasanam* (straight leg raise).^[20] In their RCT trial showed that, the loosening exercises, gentle stretches, *Yogaasanas* (stretching postures), *Sudarshankriya*, and relaxation techniques have been more effective in managing fatigue, pain, and sleep problems. Techniques that use postures interspersed with relaxation techniques (cyclic meditation/movement meditation) have been found to be useful in reducing stress and improving sleep.^[21]

Yoga reduces the stress hormones, HPA axis regulation, relaxation response, and improves parasympathetic function that reduces stress and modulate response to stressors and instill a greater control over situations.^[22, 23] This is particularly useful in cancer patients who perceive cancer as a threat and constantly ruminate on its fears. Depression causes abnormal elevation of diurnal cortisol leading to insomnia and immune suppression.^[24,25] *Yoga* helps in the reduction of depressive symptoms by changing perception and reducing intrusive thoughts. This in turn results in reduction of cortisol that is known to reduce

fatigue, improve sleep, and consequent immune response^[23]. *Yoga* modulate psycho neuroendocrine and psycho neuroimmune axis thereby restoring homeostasis and reducing the allostatic load.^[22,26] Various studies have shown reduction in cortisol and inflammatory cytokines,^[27,28] improves natural killer cell counts.^[22,29,30] These changes have been shown to modulate distressful symptoms and improve QoL of these patients. Some of the *yoga* postures for Cancer is given in Figure 4.

Figure 4. Yoga for Cancer



7. PRECAUTIONS AND CONTRA INDICATIONS

Yoga should be done under the advice of a *yoga* expert. There are numerous styles of *yoga* which are safe, some can be difficult and may not be suitable for everyone^[33]. Practicing *yoga* in extreme hot climate are not recommended for persons with diabetes, cardiac ailments, or who are at risk of complications. A relatively safe *yoga* style suitable for an individual's requirements should be practiced. Beginners must avoid heavy practice. Balancing poses should be practiced with care to avoid traumatic injuries. *Yoga* practice should be done on an empty stomach, but individuals with diabetes may take light snacks to prevent hypoglycemia.^[33]

Yoga practice should be avoided during menstruation and bone metastases in long bones may lead to fracture with some *asanas*, mostly in the elder population.^[32] Hyperventilation practices have been shown to cause pneumothorax^[31] the chances of this are high in patients with lung cancer or lung metastases undergoing radiotherapy. Patients having pleural effusion, ascites, abdominal surgeries, etc., need a more cautious approach with *yoga* interventions, slow deep breathing, *Pranayamam*, and relaxation techniques being useful in these conditions.^[32]

8. CONCLUSION

Yoga is based on the principle that the mind and body are related. *Yoga* has many health benefits, such as improving physical fitness, relaxation, and awareness of self. It has been accepted widely in society because of its safety and psychological benefits. *Yoga* practice can improve the function of different system of the body, foster psychological wellbeing and improve the oxygen delivery to tissue, remove the metabolic waste product, carcinogens and cellular toxin and scientific evidence has begun to emphasize its efficacy It is now considered a low-cost intervention to control various lifestyle disorders.

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