

VOLUME 9 (SPECIAL ISSUE 2) 2023

ISSN 2454 – 3055

**Manuscripts under Special Issue are published under the
theme “Yoga Practices and Alternative Therapies on
Human Health”**

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**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

Therapeutic Effect of Yoga on Cardiovascular Disorders - A Comprehensive Review

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Received: 17th March, 2023; Accepted: 5th May, 2023; Published online: 21st July, 2023

<https://doi.org/10.33745/ijzi.2023.v09ispl2.025>

Abstract: Yoga as a form of physical activity is growing in popularity. During yoga, individuals interrupt the stress response, which is typically associated with high blood pressure (BP), impaired focus, and high levels of anxiety. Consequently, research into yoga's effects on stress should place a special emphasis upon the interplay of the nervous and cardiovascular systems during yoga practice. Yoga and mindfulness improve the blood circulation and thereby reduces the causes of hypertension and heart attack etc. Complete yoga breathing has the role in oxygenating the blood and therefore assists fresh nutrients to reach all peripheral vessels and capillaries. It helps to prevent various circulatory ailments and illnesses such as high blood pressure, shallow breathing, muscle tension and coronary heart disease. During moderate to intense yoga exercise heart rate increases and as a result heart pumps more blood, systolic blood pressure rises and blood volume increases. It provides better circulation and formation of new capillaries. The purpose of this review is to investigate the efficacy of yoga exercise on circulatory system, pulse and heart rate, systolic and diastolic blood pressure and cardiovascular function.

Keywords: Yoga asana, Circulatory system, Pulse rate, Heart rate, Systolic, Diastolic, Blood pressure, Cardiovascular function

Citation: Sabari Girija N., Glara A.F., Sureka A. and Rajeswari K.: Therapeutic effect of yoga on cardiovascular disorders - A comprehensive review. Intern. J. Zool. Invest. 9(Special Issue 2): 128-132, 2023.

<https://doi.org/10.33745/ijzi.2023.v09ispl2.025>



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Introduction

CHD, or coronary heart disease, is caused by atherosclerosis, the hardening and narrowing of the arteries that provide blood to the heart. The development of cholesterol and fatty deposits (plaques) on the arterial wall is known as atherosclerosis. Myocardial infarction occurs when these deposits obstruct an artery that supplies blood to the heart muscle. The World

Health Organization estimates that 9.4 million fatalities were attributable to coronary heart disease (CHD) in 2016. The risk of coronary events is increased by at least a factor of two in those whose lifestyles are characterized by a lack of physical activity and psychological stress (Eaton *et al.*, 1995; Frawley, 1999). As a branch of spiritual study, yoga ranks among humanity's

most remarkable achievements. Yogic practises may help us achieve the pinnacle of self-awareness on every level of our being, from the material to the immaterial, from the sensory to the emotional to the intellectual and spiritual (www.nhp.gov.in/disease/cardio-vascular/heart/coronary-heart-disease).

When it comes to the ancient medical profession known as Siddha, the Siddhars were the go-to experts (Thirunarayanan, 2012). Historically, yoga was popularised by two ancient Indian sages: Sage Thirumoolar (Father of therapeutic yoga) and Sage Patanjali. The ancient Indian practise of Yoga is seeing a renaissance as a supplementary and alternative therapy in countries all over the globe. While practising yoga, people stop the stress response, which may lead to elevated blood pressure (BP), trouble concentrating, and a heightened state of anxiety. Hence, the interaction between the neurological and cardiovascular systems during yoga practise should be prioritised in studies investigating the effects of yoga on stress. The increased blood flow from practising yoga and mindfulness may help lessen the risk of cardiovascular problems including hypertension and heart attacks (Manchanda and Madan, 2005). Yoga has been shown in a number of studies to have beneficial effects on cardiovascular risk variables such as blood pressure (BP), lipid profiles, blood glucose, anxiety, and mortality. So, the purpose of this research was to examine the effects of yoga exercise on the cardiovascular system, including the circulatory system, the heart, and the blood pressure (both systolic and diastolic) (Aandiyappan, 2004).

Risk factors for cardiovascular disorders:

- Lifestyle habits: Sedentary lifestyle, cigarette smoking, obesity, diet rich in calories, bad cholesterol, saturated fats, increased salt intake
- Genetic Factors: Age and sex or predisposing factors
- Drug and Contraceptive pills also have been reported to trigger the cause

- Personality traits: like aggression, hyper activity, impatience, excessive competitive drive etc.
- Lack of exercises: reduces excessive tolerance, causing early fatigue and exhaustion.
- Psychosocial factor: have over ruled the other causes in present day situations.

Yoga books such as Thirumoolar's Astanga yoga, textbook of Yoga and rehabilitation and various yoga related books were explored and research papers published in various databases such as PubMed, Scopus, Research Gate, Medline, Google Scholar and websites were analyzed regarding the effect of yoga in the management of cardiovascular disorders.

Effects of Yoga in Cardiovascular Diseases:

Melatonin, GABA, and many other neurotransmitters are known to rise in response to yoga and meditation. An increase in positive emotions and a decrease in stress hormones are two solid indicators that yoga may help people cope with stressful situations. Moreover, frequent yoga practise is associated with reduced oxidative stress and enhanced endothelial function due to increased nitric oxide bioavailability. Adiponectin levels are raised and leptin resistance is lowered in response to yoga, suggesting that the practise has anti-inflammatory and insulin-sensitizing benefits. The levels of the inflammatory marker interleukin-6 in the blood are lowered and the number of genes involved in the inflammatory response are decreased by mindfulness meditation (Hajar, 2017).

Therapeutic Effects of Preventive Asanams:

Padmasanam:

Padmasanam expands our blood vessels and raises our blood pressure. In this way, it controls cholesterol levels and lowers the risk of heart disease.

Uttanasanam:

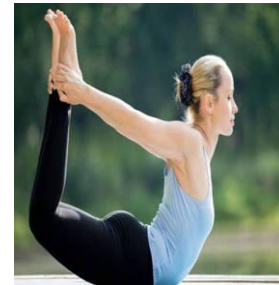
Uttanasanam is a relaxing posture for heart ailments. It improves tissue health through



Uttanpadasanam



Bhujangasanam



Dhanurasanam



Salabhasanam



Ustrasanam



Sarvangasanam

Fig. 1: Asanas.

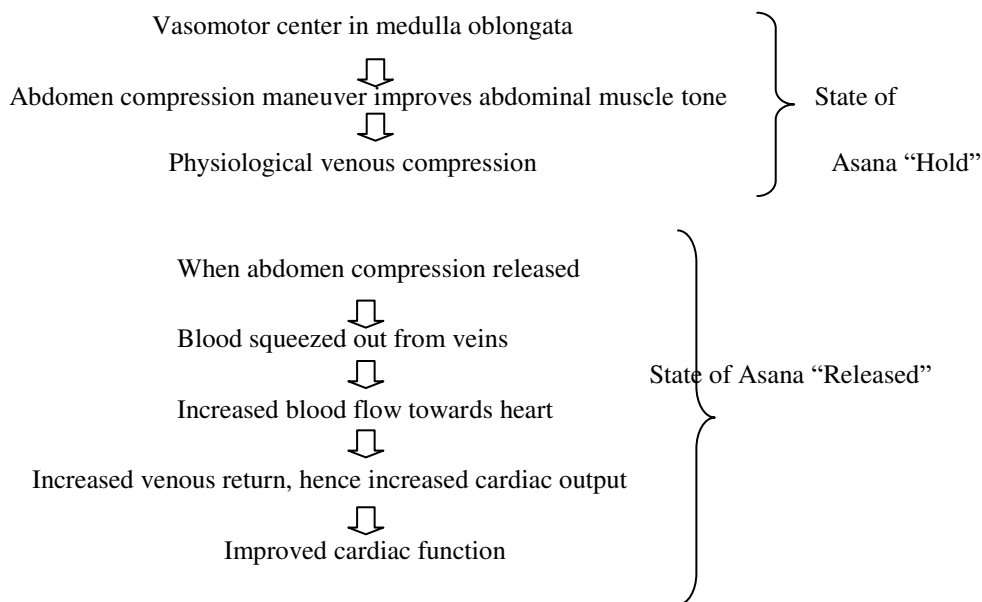


Fig. 2: Abdominal compression reflux.

increasing the vascularity in all tissues and organs.

Savasana:

Savasana, or corpse position is one of the

simplest yoga postures for regulating blood pressure. Positive effects on cardiac autonomic modulation and reduced cardiac sympathovagal balance have been seen in hypertension individuals after this relaxation. Suppresses

anxiety and promotes mental peace.

Mechanism of Yoga on Cardiovascular Disorder:

Yoga can have beneficial benefits on cardiovascular problems through the stimulation of the baroreceptors reflex and abdominal compression reflex (Fig. 1).

Baroreceptors Reflex:

It is a main reflex which is sensitive to rapidly changing pressures and postures. Yoga can stimulate the baroreceptors and reduce the heart rate and blood pressure through vasodilatation. It can be manifested by the following asanams:

- Ustrasanam
- Sarvangasanam

Ustrasanam:

Ustrasanam is a great yoga asana for stretching the chest muscles and expanding the heart. It helps those with hypertension by reducing their blood pressure. It promotes cardiovascular health by increasing blood flow throughout the body.

Sarvangasanam:

It causes changes in vasomotor ability due to the increased interchange of blood in the upper part of the body. Due to its inverted position the heart has to work less to provide oxygenated blood to those organs which were hard to reach, which helps in relieving stress on the heart.

Abdominal compression reflex:

Yogic postures like uttanpadasana, bhujangasanam, dhanurasanam and salabasanam causes abdominal compression reflex. Regular practice of these asanams helps in regulating blood pressure (Fig. 2).

Uttanpadasanam:

While performing the Uttanpadasana, reduction in the constant pressure allows the heart to function more effectively. It might boost the circulatory system allowing a more effortless blood flow through the veins and heart (Aandiyappan, 2004).

Bhujangasanam:

Bhujangasanam invigorates the heart and relieves stress and fatigue. It improves circulation of blood and oxygen especially in the heart and spine. This yogic posture opens the chest and helps to clear passage of the heart and lungs (Aandiyappan, 2004).

Dhanurasanam:

Dhanurasanam gradually helps in regulating blood pressure. It is very good for the proper functioning of our heart (Aandiyappan, 2004).

Salabasanam:

Salabasanam pose relieves stress levels of the body by creating good vibes for the mental health of the person. It seems to reduce hypertension (Aandiyappan, 2004).

Conclusion

Worldwide, cardiovascular disease is the major cause of death and disability. Mind-body practise yoga, which includes physical postures (asana), breathing exercises (pranayama), and meditation (dhyana), is becoming more popular. With the help of conventional therapy, yoga may lessen biochemical risk factors for cardiac illness, improve reperfusion status in patients with IHD, and even prevent heart attacks. When it comes to preventing cardiovascular disease, yoga looks to be a generally risk-free activity that may be implemented into both primary and secondary preventive programmes.

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