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CLINICAL ROLE OF YOGA IN CARDIAC MUSCLES OF HUMAN BEINGS

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ABSTRACT

Globally, cardiovascular disease is the primary cause of illness and mortality. Yoga, which combines physical postures (asana), breathing techniques (pranayama), and meditation (dhyana), is becoming more and more popular as a mind-body workout. Since then, yoga has demonstrated potential as a practical lifestyle intervention that may be included in algorithms for managing cardiovascular disease. Even though numerous researchers have documented the clinical advantages of yoga in lowering cardiovascular events, morbidity, and mortality, there isn't much data to back up these findings, which highlights the necessity for a meta-analysis that minimizes bias and methodological flaws.Therefore, in this narrative review, we intended to review the emerging evidence assessing the physiologic and clinical effects of yoga on the cardiovascular system and the potential role of yoga as a component of comprehensive cardiac rehabilitation.

Keywords **:** Yoga ; Clinical role ; Cardiovascular disease, Cardiovascular disease risk-factors, Coronary heart disease ; Hypertension; Rheumatic heart disease.

INTRODUCTION

The Sanskrit word for yoga means "union" or "connection." In a more symbolic sense, it is the union of the soul "atman" with the absolute or supreme soul, or "paramatman" (i.e., God). It combines physical postures (asana), breathing techniques (pranayama), and meditation (dhyana) to achieve a state of balance between the body, mind, and soul, ultimately leading to the soul's emancipation (moksha).While the philosophy and practice of yoga date back to the pre-Vedic times in the Hindu tradition, it was introduced to the West only in the late-19th and early-20th centuries. Despite the general acceptance and incorporation of yoga in the West for the last few decades, it remained confined to the realm of alternative medicine until the beginning

of the 21st century. Over the last 10 to 15 yr, the concept of yoga has gained increasing attention in the medical scientific community due to a greater recognition and understanding of the mind-body connections in numerous medical disorders. In addition to reigniting the interest in yoga, this has led the medical scientific community to pursue evaluation of the role and benefits of yoga using the current paradigms of evidence-based medicine. [1] Heart and blood vessel illnesses are collectively referred to as cardiovascular diseases (CVDs).One Over the past 15 years, the World Health Organization (WHO) has raised alarms about the growing burden of CVDs. [2] The leading cause of death worldwide is CVDs. In 2015, over 17.7 million deaths worldwide were attributed to CVDs, accounting for 31% of all fatalities. The majority of CVDs could be avoided by controlling their risk factors. One Changes in lifestyle lower the risk of CVDs, making them helpful for both primary prevention and improved management. [3] Economic loss resulting from debilitating and mortal outcomes of various cardiac diseases has resulted into billions of dollars spent for healthcare and reduced work productivity. Although the progress in medical treatment has resulted into a reduction in the rate of mortality resulting from different cardiac diseases, these are still the most important cause of death worldwide. [4,5] Evidence suggests that yoga-based lifestyle intervention might retard and possibly revert the progression of CVDs. [5] Though there are various review articles on the effect of yoga on blood pressure (BP),[5] CVD risk-factors,[6] and CVDs [7] particularly in hypertension (HTN), [6] there is a lack of a comprehensive review providing the detailed role of yoga in all the aspects of CVDs . [7] This review provides an overview of the emerging evidence assessing the physiologic and clinical effects of yoga on the cardiovascular (CV) system and the potential role of yoga as a component of comprehensive cardiac rehabilitation (CR).

MATERIALS AND METHODS

In the present study we performed a comprehensive literature search in the PubMed/Medline electronic database to review relevant articles in English, using some ten to twelve keywords “clinical role of yoga, cardiovascular disease, yoga and cardiac rehabilitation, yoga and cardiac failure, yoga and cardiovascular disease risk-factors, yoga and coronary heart disease, yoga and hypertension, and yoga and rheumatic heart disease. A Medline/pubmed search was launched under the terms ‘yoga’, ‘cardiac health’ and ‘cardiac disease’. All citations of relevance published over a period of 15 years (1999-2024) were selected and reviewed.

HISTORICAL PERSPECTIVES

There is ongoing discussion on the precise beginnings and development of yoga. [8] According to current knowledge, yoga first appeared in ancient India, with the Indus Valley Civilisation (3300–1900 BCE) providing the oldest accounts. [9] The Vedic era (1500–500 BCE), the pre-Vedic eastern Indian states, and the "sraman.a" movement—an Indian religious movement that emphasises austerity—are credited with later

developments. [10] Vedic yoga (1500–500 BCE), pre-classical yoga (500–200 BCE), classical yoga (200 BCE–500 CE), and post-classical yoga (500–1500 CE) are the four convenient periods into which the history of yoga can be separated . [11] The Vedas, or "praise of knowledge," are regarded as the cornerstone of Hinduism and include early, ill-defined proto-yogic concepts and practices. Yoga started to take on a more defined shape in the pre-classical period, when the philosophy and tenets were clearly recorded in texts like the Upanishads. There are clear explanations of yoga in the Yoga Tattva Upanishad that deal with posture, breathing techniques, and mental training. The teachings of Jnana yoga (the path of knowledge) and Karma yoga (the path of action or ritual) emerged at this time . [12] Patanjali's (~600-400 BCE) *Yoga-Sutra* (aphorisms of yoga) is considered the foundation for the current practice of yoga. It has the most extensive commentary on yoga and consists of 196 aphorisms or *sutras* (threads) that describe the 8-fold path of yoga (also called the 8 limbs of classical yoga). This was the classical period of yoga and is also referred to as the *yoga-darshana* or *raja-yoga*. Over time, non-classical schools have led to the development of post-classical yoga.The post-classical era resulted in the evolution of many new branches of yoga, such as Tantra yoga, Siddha, and Hatha “body” yoga. Around the dawn of the 20th century, prominent Hindu philosophers and monks such as Swami Vivekananda introduced modern Hinduism, vedantic philosophy, and yoga to the West. Subsequently, noted gurus such as Swami Kuvalayananda and Yogendraji disseminated the systematic practice of yoga more widely. In addition, they established a scientific platform by initiating research and starting centers for learning, research, and dissemination of yoga . [13] In the last 3 decades, yoga has gained popular acceptance in the United States and hundreds of yoga centers have emerged across the country. It is estimated that the number of people who practice some form of yoga in the United States has grown from 4 to 36.7 million between 2001 and 2016, with an estimated $16 billion spent annually. In 2014, the United Nations General Assembly approved a resolution establishing June 21 as “International Day of Yoga,” and the first International Day of Yoga was observed in 2015. Multiple types of yoga are currently popular including Iyengar, Bikram, Kundalini, Integral, Yin, Vinyasa, Jivamukti, Anusara, and Vinyoga. [14]

YOGA IN THE PRIMARY PREVENTION OF ISCHAEMIC HEART DISEASE:-

Stressors of urban and modern lifestyle have long been postulated to be major contributors to many an illness including ischaemic heart disease. Mindfulness-based stress reduction (MBSR) such as yoga has been shown to decrease the average number of visits to the primary care physician among middle-class populations in inner city areas in the USA. [1] This observation suggests that yoga may contribute to the general health and particularly to cardiac health in the populations that are subject to significant mental stress . [15]

PHYSIOLOGICAL EFFECTS OF YOGA

An extensive body of literature supports the favorable neurohumoral effects of yoga such as decreased serum cortisol, catecholamine, and aldosterone levels. Chronic activation of the aforementioned pathways has been described in a majority of CV disease states including hypertension and heart failure (HF). In addition, yoga and meditation have been found to increase melatonin, γ-amino butyric acid, and a myriad of other neurotransmitters. Importantly, a decrease in stress markers, such as 8-hydroxydeoxyguanosine, and an increase in endorphin levels with yoga strongly suggest its role in mitigating the effects of stress in humans. In addition, the regular practice of yoga is known to attenuate oxidative stress and improve endothelial function by enhancing bioavailability of nitric oxide. [16-18] There is now clear evidence regarding the role of inflammation in the pathophysiology of coronary artery disease (CAD) and other vascular diseases. Systemic inflammation is a strong predictor of all-cause mortality. Yoga has been shown to have anti-inflammatory and insulin-sensitizing effects by increasing adiponectin levels and decreasing leptin resistance. Mindfulness-based meditation can reduce pro-inflammatory response gene profiles,and yogic meditation appears to reverse nuclear factor-κB-related transcription of pro-inflammatory cytokines.

DISCUSSION

Effects of Yoga on Cardiovascular Risk Factors

Several investigators have studied the impact of yoga on the spectrum of traditional CV risk factors such as diabetes, hypertension, hyperlipidemia, and smoking. In a comprehensive meta-analysis of 44 randomized controlled trials (RCTs), study [19] demonstrated the beneficial effects of yoga ($P < .05$) on blood pressure (BP), heart rate (HR), abdominal obesity, measures of insulin resistance, and blood lipid levels, when compared with usual care, both in healthy participants and high-risk patients. In the yoga group, systolic blood pressure (SBP) decreased by a mean of 6 mm Hg, diastolic blood pressure (DBP) by 4 mm Hg, HR by 7 beats/min, waist circumference by 2 cm, and hemoglobin A_{1c} by 0.5%. In addition, there were significant improvements in low-density lipoprotein cholesterol, with a mean decrease in total cholesterol of 13 mg/dL, of 6 mg/dL, and triglycerides of 21 mg/dL, as well as an increase in high-density lipoprotein cholesterol of 3 mg/dL. Similar results were reported by in a systematic review and meta-analysis from 2016. However, in this analysis, the effect of yoga was comparable to exercise therapy. In a “systematic review of systematic reviews” on the effect of complementary and alternative medicine in lowering blood lipid levels, another study noted an overall positive effect of yoga. [20, 21]

Smoking

According to data from the INTERHEART study, smoking ranks second only to hypercholesterolemia as the strongest risk factor (3-fold increased risk) for myocardial infarction.By targeting stress and behavioral urges associated with craving, yoga is increasingly being recognized as a promising complimentary therapy in addition to conventional medical therapy for smoking cessation. Numerous forms of yoga such as

Ashtanga, Hatha, Vinyasa, and Yin yoga, through exercise and movement, enhance mood, reduce negative affect, and decrease the severity of withdrawal symptoms. Bock et al[22] studied the efficacy of yoga as a complementary therapy for smoking cessation in 55 women who received an 8-wk group-based cognitive-behavioral therapy and were randomized to either a twice-weekly Vinyasa yoga program or wellness program (control group). Seven-day point-prevalence abstinence rates were significantly higher in the yoga group compared with controls (OR = 4.6). At 6 mo, although the abstinence rates remained higher in the yoga group, the difference did not reach statistical significance. In a 2013 systematic review of 14 clinical trials, including 8 RCTs, on the effect of mind-body interventions on smoking cessation, Carim-Todd et al [23] reported favorable changes in smoking behavior and predictors of smoking behavior with these interventions. Of the 14 studies included in this meta-analysis, only 3 assessed the effects of yoga on smoking cessation. Chu et al, [24] using published literature on risk factor reductions through diverse lifestyle interventions (ie, walking, Mediterranean diet, and group therapy smoking cessation) found in the base-case analysis, concluded that yoga was associated with the largest 10-yr CV disease risk reduction (maximum absolute reduction 17% for the highest-risk individuals). In summary, all of the above evidence suggests that, in this era of individualized medicine, yoga could potentially be used as a lifestyle modality for effective primary and secondary prevention of CV disease due to its favorable impact on multiple traditional and emerging CV risk factors.

Impact of Yoga in Specific Cardiac Disease States

Over the last decade, several studies have described the impact of yoga on moderating the effects of various cardiac disease states including autonomic dysfunction, arrhythmias, CAD, and HF.

Effects of Yoga on Cardiac Diseases [17, 15 , 25]

Cardiac Disease Effect

Autonomic dysfunction	Increased heart rate variability, increased vagal output, decreased sympathetic arousal
Arrhythmias	Reduced atrial fibrillation episodes, decreased atrial fibrillation-related symptoms and anxiety, reduced number of nonfatal device-treated ventricular events, no proven mortality benefit
Coronary artery disease	Reduced angina episodes, increased exercise time, no decrease in recurrent coronary events such as myocardial infarction, no mortality benefit
Heart failure	Longer exercise time, greater maximal oxygen consumption, improved physical function like strength and balance, no mortality benefit

CONCLUSION

The studies conducted by different workers have shown that yoga has significant positive effect on cardiac muscles of human being.

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