

## NON-PHARMACOLOGICAL TREATMENT OF HYPERTENSION

## Yoga and Hypertension

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## ABSTRACT

High blood pressure (BP) is a major public health problem worldwide. It is an important risk factor for acute myocardial infarction, cerebrovascular disease, chronic renal failure, and congestive heart failure. Lifestyle modifications play an important role in prehypertensive individuals and also act as an adjunct to antihypertensive therapy. Yoga practices have been shown to be effective in reducing BP in hypertensive population. The probable mechanism by which yoga reduces BP is by reduction in sympathetic activity, facilitating autonomic balance, which reduces chemoreceptor responses, and enhancing baroreflex sensitivity. Yoga is also effective as an adjunct therapy in reducing antihypertensive medication use. There is a need for recognition of yoga by our health system as a complementary therapy for treating hypertension (HPT).

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## INTRODUCTION

Hypertension is an important health problem worldwide.<sup>1</sup> Hypertension is defined as the BP level that increases the vascular risk substantially to require intervention. Normal systolic BP (SBP) ranges between 100 and 140 mm Hg and diastolic BP (DBP) between 60 and 90 mm Hg. It is estimated that HPT affects more than 36% of the adult population in the south-east Asia region. It is responsible for 9.4 million premature deaths and 64 million disability-adjusted life years every year.<sup>2</sup> It is estimated that, by the year 2025, 1 in 3 adults worldwide (approximately 1.56 billion people) will have HPT.<sup>3</sup>

High BP is an important risk factor for acute myocardial infarction, stroke, chronic renal failure, arterial aneurysm, and congestive heart failure. Every incremental rise of 20/10 mm Hg in BP increases the risks of mortality and morbidity associated with cardiovascular and

cerebrovascular diseases.<sup>4-7</sup> Antihypertensive therapy is associated with a reduction in the stroke incidence of 35 to 40%, myocardial infarction incidence for 20 to 25%, and heart failure for more than 50% of patients.<sup>2</sup>

Approximately 90 to 95% of the cases of high BP is primary HPT; the rest are categorized as secondary HPT. Secondary HPT refers to HPT secondary to renal, endocrine, or nervous system diseases. The prevention and management of high BP is a major public health challenge.

Over a period of time, many antihypertensive drugs were developed for lowering BP. Epidemiological evidence provides clear evidence that lowering the BP can remarkably reduce the risk of cardiovascular mortality and morbidity. Treating high BP also slows down the progression of retinopathy, renal disease, and all-cause deaths.<sup>8</sup>

However, the long-term use of antihypertensive drugs will produce side effects, and may even produce resistance and affect therapeutic efficacy.<sup>4</sup> Therefore, seeking an alternate method of treatment is an important issue in BP therapy. Lifestyle modifications play a role in preventing HPT in prehypertensive individuals. It also plays an important role before the start of drug therapy in hypertensive individuals, and acts as an adjunct to drug therapy.<sup>9</sup> Lifestyle modifications alone can reduce SBP up from 3 to 32 mm Hg and DBP from 2 to 18 mm Hg.<sup>10</sup> Complementary and alternative medicine in the form of yoga are recommended for lowering BP in hypertensive patients. Yoga has been shown to be useful in managing HPT, cardiovascular disease (CVD), and diabetes.<sup>11-13</sup>

The term yoga comes from the Sanskrit word "YUG," which means yoke or union. Yoga is a total science of strengthening and improving the physical, mental, and spiritual states of being. The disciplines pertaining to the physical aspects of yoga focus on improving the health and augmenting the strength of the body. Yogic techniques include the practice of pranayama or breathing exercise, asana or specific postures, and meditation.

The classic yogic practices include hatha yoga, karma yoga, chi yoga, kundalini yoga, and raja yoga. Chi yoga is related to a culture of knowledge, hatha yoga includes the spirit system and the body system; karma yoga advocates the inner practice leading to perfect behavior, and raja yoga is related to mind and breath.

Hatha yoga has become increasingly popular, in recent years, for improving quality of life, dealing with

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stress and a number of psychiatric and psychosomatic disorders as well as improving psychological function.<sup>14</sup> Hatha yoga includes a diverse range of mind–body practices, such as breathing practices (pranayama), meditation techniques (dhyana), and physical postures (asanas).<sup>15</sup> The probable mechanism by which yoga may reduce BP is by inducing slow rhythmic proprioceptive and exteroceptive impulses.

It also reduces peripheral adrenergic activity, facilitates autonomic balance, which reduces chemoreceptor responses, and enhances baroreflex sensitivity.<sup>16–18</sup> Yoga has been used to reduce high BP and help to effectively manage obesity, lipid profile, glycemic control, and other CVD risk factors.

Yoga can be used for the treatment of many stress-induced disorders like anxiety, insomnia, depression, and bronchial asthma. Yoga has also improved many metabolic functions, such as carbohydrate metabolism, lipid profile, and BP. Health care workers have now become aware of yoga for its ability to improve various health conditions. However, still, yoga has not been widely used for reducing high BP.

Studies have demonstrated the value of total body relaxation postures, Savasana, for HPT.<sup>19,20</sup> For seeking the best clinical evidence of yoga in making decisions for hypertensive patients, an increasing number of meta-analysis and systematic reviews have been conducted to know the efficiency of yoga for controlling HPT.

It is demonstrated that yoga could reduce risk factors of HPT like high cholesterol, overweight, high glucose level and also reduce BP.<sup>21–23</sup> A review study suggested a definitive role for yoga in the primary and secondary prevention of ischemic heart disease.<sup>24</sup> However, a systematic review concluded put forth strong evidence that the benefits of yoga in conjunction with other medication help in the prevention and treatment of coronary heart disease, but it also showed that yoga alone leading to reductions in BP was poor.<sup>25</sup> Another systematic review found the beneficial effects of yoga for people with metabolic syndrome.<sup>22</sup> A subset analysis of the above studies found that in individuals with metabolic syndrome, yoga practice was helpful in producing short-term reductions in BP.<sup>22</sup> A further review found evidence for the efficacy of yoga in significant reductions in body weight, cholesterol, and blood glucose as well as in reducing BP.<sup>26</sup>

One review reported benefits of yoga for hypertensive patients. Yoga was cheaper than pharmacological therapies and, despite there being very few randomized controlled trials, the review suggested that yoga may serve as an alternate to drugs in controlling HPT.<sup>21</sup> Another review study on yoga and HPT revealed that a diversity of yoga practices were consistently effective in reducing blood cholesterol, blood glucose, and body weight.<sup>27</sup>

Research performed over the past 40 years with various yoga interventions, including studies with different experimental designs, consistently reported reductions in BP together with reductions in other cardiovascular risk factors, such as lipid profile, glycemic index, weight, and heart rate.

The BP reductions reported with yoga were found in diverse populations, including adolescents and the elderly as well as both normotensive and hypertensive populations and unfit and athletic individuals. Yoga not only reduces BP in hypertensive patients, but also reduces the dose of medications already taken by patients. Yoga practices generally lead to a calm, quiet, hypometabolic, meditative state associated with autonomic balance and characterized by positive physiological changes and improved cardio, circulatory, and respiratory functions.

Therefore, yoga may influence BP through reducing the stress response, increasing parasympathetic activation, and altering baroreceptor sensitivity. Rise in BP is a part of the sympathetic response that is associated with tension, aggression, excitement, anxiety, and anticipation in stressful situations.<sup>28</sup> Substantial evidence has also been shown that sympathetic activation and psychological stress are important risk factors for coronary artery disease, HPT, and cardiovascular mortality.<sup>29,30</sup> Evidence has also shown that individuals who exhibit exaggerated cardiovascular response during mental stress are at increased risk for developing HPT in future.<sup>31,32</sup> Yoga techniques are associated with reduction of basal cortisol and catecholamine secretion, a decrease in sympathetic activity, with a corresponding increase in parasympathetic activity.<sup>33</sup> Other such evidence suggests that yoga also improves autonomic stability in diabetic and hypertensive individuals.<sup>16</sup> Many different yoga practices adapted or individualized by teachers and practitioners, but having a common element for these practices appear to be the practical application of mind–body integration, with the use of the breath as a focus for the link between body and mind.

It is still not clear, however, which aspects of yoga are more important in reducing BP. The variations of yoga practices and lack of standardized research make it difficult to formulate clinical guidelines or prescriptions involving yoga. This difficulty is acknowledged in the guidelines of the British Hypertension Society, which states that “interventions to reduce stress management, meditation, yoga, cognitive therapies, breathing exercises, and biofeedback have been shown to result in short-term reductions in BP, but the interventions studied have been so varied, it is difficult to be prescriptive with regard to an effective strategy.”<sup>34</sup> Thus, while these guidelines discuss the importance of lifestyle modifications for all

hypertensive patients, they focus on aerobic exercise, dietary control, weight reduction, smoking cessation, alcohol reduction, salt restriction, and do not mention yoga, relaxation, or other stress-reduction practices.

The Canadian Hypertension Education Program does recommend stress management in the form of cognitive behavioral interventions in hypertensive individuals in whom BP elevation is due to stress, but does not consider yoga as a stress-management strategy.<sup>35</sup>

## CONCLUSION

Yoga practices have been shown to be effective in reducing BP in hypertensive population.

Yoga is also effective as an adjunct therapy in reducing antihypertensive medication use. It appears that yoga is most commonly used as a spiritual and personal development path for specific medical conditions, and this has resulted in many different yoga practices being used.

The lack of long-term studies, standardized protocols, and conclusive results from meta-analyses makes it difficult to recommend any specific yoga practice for HPT, and this has resulted in stress-reduction strategies, such as meditation and yoga, being omitted from clinical HPT guidelines. Physicians are reluctant to recommend yoga for their hypertensive patient, if they cannot ensure the quality or relevance of particular yoga practices.

Yoga alone or combined with medication has been widely used for treating HPT. There is a need to provide better recognition of yoga by the health system, which can serve as a complement to conventional medical therapy. Future research should focus on high-quality clinical trials with standardized yoga practices and long-term follow-up, together with possessing the knowledge of the mechanisms of action of different practices.

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