
Is There a Role for Stress Management in Reducing Hypertension in African Americans?

Kofi A. Kondwani, PhD; Charlie M. Lollis, PhD

When stress is considered as any demand placed on the body, the focus is shifted away from the stressor to how the body responds to the stress. There are psychological, physiological, and behavioral responses to excessive stress. Left unaddressed, cardiovascular or cerebrovascular diseases may occur. The goal of meditation is to decrease mental activity while simultaneously resting and rejuvenating the body. There are internal and external approaches to meditation. The most researched internal form of meditation is the Transcendental Meditation technique, which has been found to reduce stress, depression, anxiety, and blood pressure in hypertensive African Americans. Clinical use of stress management approaches, particularly Transcendental Meditation to reduce hypertension, is supported by randomized clinical trials. Studies with larger numbers of participants and more diverse ethnic groups should continue. (*Ethn Dis.* 2001;11:788-792)

Key Words: African American, Hypertension, Stress Management, Transcendental Meditation

Introduction

This presentation will address the impact of stress on our mental, emotional, and behavioral interactions and it will discuss the role of stress management to reduce this impact in hypertensive African Americans. Today the word stress is used to describe a variety of physiological and psychological assaults to our mind, body, and behavior. Stress is directly or indirectly blamed for illness, emotional outburst, and negative behaviors that in turn contribute to chronic diseases, particularly cardiovascular and cerebrovascular diseases.

What is this mess called stress? Any demand placed on our mind or body is a working definition of stress.¹ Whether the stress demand is positive, negative, or in-

ternally or externally derived is less important than how our bodies respond or react to the stress. For example, someone can be told they have just won the \$70 million state lottery and be so overwhelmed that they have an immediate heart attack or stroke; good news, but a potentially fatal response. All stress is not destructive; stress and tensions are necessary aspects of life. It is one of the conditions upon which life is manifest from the single atom to the most complex organism.

When our mind is over-stressed, it loses the ability to perform even the most basic tasks. We experience poor thinking. Our mind tends to wander and lose its ability to focus. We tend to worry actively and forget easily. Our concentration is poor and there is a drop in productivity at work and at home. Our self-concept diminishes and our attitude toward self and others lacks a positive perspective. Emotionally, our response to stress can manifest as frequent anger outbursts, mood swings, or feelings of despair.

From the Morehouse School of Medicine, Behavioral Medicine Research Center, Atlanta, Georgia.

Address correspondence and reprints requests to Kofi A. Kondwani, PhD; Morehouse School of Medicine; 75 Piedmont Ave; Suite 508; Atlanta GA 30303.

Overwhelming experiences of sadness or regret for uncharacteristic behavior can also be an offshoot of too much stress in our lives.

As internal emotions intensify, we begin to cover-up the negative feelings by over-eating or drinking excessive amounts of alcohol. Tobacco and illicit drug use are common approaches to subdue feelings of stress and fatigue. Social isolation and physical inactivity could also be a result of not being able to cope with too much negative stress.

Over time, headaches or backaches can develop in a direct relationship to the stress we encounter. Sleep dysfunction, such as frequently waking up in the night or the inability to fall asleep, could persist. Diarrhea, nausea, sweating, an upset stomach, or frequent heartburn could be indicators of the body's response to stress.

Left unaddressed, these abnormalities can continue to fester within the body until one or more diseases become manifest. One such disease, which has been associated with stress and is all too common in the African-American population, is hypertension.²⁻⁴ The consequence of chronic hypertension is cardiovascular disease (CVD), which often results in partial or total dependency on health care and is the number one cause of death in the United States.⁵

One way to reduce stress is hidden in the spelling of the word stress. Take off "ss" at the end of stress and relocate the "st" from the beginning to the end and you have it: rest. Rest is the basic activity of healing and rejuvenating the mind and body.⁶ Rest and relaxation should not only occur during sleep. A deep rest can be attained and sustained through the practice of meditation.⁷ Meditation simply means thoughts. Generally, meditation refers to methods to reduce the thinking process, allowing the mind to decrease mental activity, which in turn enables the body to rest and heal.

The mind and body each have two modes of operation (Table 1). The mind is either 1) alert and aware of its surroundings;

Table 1.—Four natural states of consciousness

		MIND	
		Alert	Non-Alert
BODY	Active	Waking state	Dreaming state
	Rest	Transcendental state	Sleeping state

non-alert and unaware of its surroundings. The body is either 1) active as indicated by higher breath and heart rates; or 2) at rest with lower breath and heart rates. The two modes of the mind and two modes of the body should yield four, physiologically distinct modes from interactions between them.

When the mind is alert and the body is active, this interaction produces the waking state of consciousness. When the mind is not alert and the body is at rest, this produces the sleep state of consciousness. When the mind is not alert and the body is active (ie, random eye movement or actively digesting food), this interaction produces the dream state of consciousness. These three states of consciousness (waking, sleeping and dreaming) are naturally experienced daily to some degree.

However, in modern daily life, we lack the experience where the mind is awake and alert, yet the body, as indicated by reduced heart and breath rates, is resting. This fourth state of consciousness, physiologically distinct from the other three, is what is missing from normal daily routine.⁸ Meditation brings about the experience of this fourth state of consciousness, thereby setting up the conditions for both the mind and body to rest, heal, rejuvenate and release stress.

Meditation strategies can be categorized as external or internal, depending upon its approach to reducing mental and physical activity. External meditations refer to pro-

cesses that initiate a quieting of the mind starting from external means. Examples of external meditation include: Yoga, Tai Chi, progressive muscle relaxation, or the use of external sounds such as music, recorded sounds of ocean waves, gong sounds or other sounds that are pleasing and soothing to the mind and, therefore, the body.

Internal meditation strategies require no external movements or sounds to reduce mental activity. Usually the person sits in a chair comfortably or on the floor in a specific position with eyes closed and their attention directed inward. Internal meditations include contemplation, concentration, and transcendental meditation. Contemplation implies thinking or visualizing something or some place that is relaxing and calming. Concentration involves focusing the mind on a specific thought or object, such as the flame of a candle or a spot on the wall. Each time the mind wanders, instructions are to whip it back to the target object. Both contemplation and concentration require effort and focus. They can reduce mental and physical activity to some degree, but many find it difficult to maintain focus to achieve physiological rest.

The Transcendental Meditation (TM) technique is the most researched of the internal meditation practices.⁹ TM is a simple, natural, mental technique practiced 20 minutes twice daily, sitting quietly and comfortably, with eyes closed. Mentally, TM allows the mind to settle down and experience quieter levels of itself.¹⁰ Physically, the body settles down, breath and heart rate slow down, resulting in healing and rejuvenation throughout the body.¹¹

During the practice of TM, the mind settles down as many thoughts become few, until thoughts are transcended altogether and pure silence is experienced. No object of perception is in the awareness during short periods of time while practicing TM. As the mind settles down to quieter levels, so does the body. Heart and breath rates decrease.⁷ Changes in skin resistance and

brain wave patterns have been found to occur during the practice of TM.¹² A decrease in stress hormones in the blood has also been measured.¹² In a meta-analysis of 146 studies, anxiety measures decreased more in the groups that practiced TM compared to other forms of meditation or relaxation.¹³

Behavior does negatively or positively impact health. Individuals who practice the TM technique show decreased cigarette and alcohol consumption and decreased illicit drug use.¹⁴ Depression is reduced in studies of TM while self-actualization measures increase.¹⁵ Improved and more positive health habits have been measured in groups that practice TM compared to controls.

In a randomized clinical trial of stress management to reduce hypertension in older African Americans, results indicated that the group that practiced the TM technique reduced their blood pressure by an average of 10.7 mm Hg systolic ($P = .0002$) and 6.4 mm Hg diastolic ($P = .0005$) after three months of practice compared to a usual care control group.^{16,17} This study found progressive muscle relaxation reduced blood pressure approximately half that of the TM group. A third group of usual care had a slight increase in blood pressure over the same period. In a five-year survival follow-up of this cohort, it was found that the group that practiced the TM technique had significantly fewer deaths from CVD and all cause mortality than the combined PMR and usual care groups.¹⁸

It has been consistently shown that TM reduces blood pressure, although it was not known if TM had any measurable anatomical effect on the cardiovascular system. In another randomized clinical trial, as part of a NIH-supported effort, Kondwani et al¹⁹ found a significant regression in left ventricular mass (LVM) in the TM and a health education groups after one year of intervention. In addition to LVM regression, the TM group showed a significant decrease in anxiety, depression, and sleep dysfunction, and an increase in energy and health locus

of control; the health education group did not improve in these areas.²⁰ Plaque is implicated in cardiovascular and cerebrovascular diseases. In a study of hypertensive African Americans, researchers found a significant regression of atherosclerotic plaque in the carotid artery compared to a health education control group after eight months of intervention.^{21,22}

Morehouse School of Medicine (MSM) has recently completed two clinical trials on TM, anger management and health education supported by the National Heart, Lung, and Blood Institute and the Department of Defense. Both of these trials sought to compare non-drug approaches to reduce blood pressure in hypertensive African Americans. The data collection phase of these two trials is complete. Preliminary analysis of the 84 participants, with no difference in baseline demographic variables (47% male, average age $50 \pm [9.4]$ years), indicates that there was no difference in interventions between groups.²³ Within group analysis indicated significant reduction in blood pressure in each group. Currently, MSM is in the recruitment phase of a clinical trial supported by the National Center for Complementary and Alternative Medicine. This trial is investigating the effects of TM and health education on atherosclerotic plaque in African Americans with coronary artery disease, hypertension, diabetes, or other high-risk behaviors for CVD.

Future Research Direction

Continuation of behavioral medicine research as described above is warranted. How TM, progressive muscle relaxation, and anger management affect comorbid diseases such as hypertension, diabetes, and obesity should be investigated. Studies with increased numbers and more diverse populations, such as Native American or Hispanic American populations, should be supported due to the excess CVD in these ethnic groups.

When TM is combined with health edu-

cation or anger management is there an additive effect? This question has not been addressed in past research. Given the consistencies of the results thus far, large-scale community demonstration projects could be implemented. A community-wide stress management program could be a next step toward policy initiatives that support clinical use of these behavioral medicine approaches to prevent or reduce risk of CVD in over-exposed populations.

Conclusion

Stress management using TM, progressive muscle relaxation, and anger management has been found to reduce blood pressure. These non-invasive behavioral approaches are inexpensive when compared to a lifetime of antihypertensive drug therapy or the cost of end-organ damage after years of uncontrolled blood pressure.²⁴ Furthermore, compliance with these non-drug strategies has been reported as high as 97%.¹⁷ The Joint National Committee on the Detection and Treatment of Hypertension VI (JNC-VI) continues to recommend that lifestyle modification strategies be used before antihypertensive medication is prescribed and in conjunction with antihypertensive therapy.²⁵ Continued research and increased clinical use of behavioral medicine approaches for the prevention and treatment of hypertension is supported by randomized clinical trials. Large-scale demonstration projects and clinical trials with larger numbers of subjects and diverse populations should be the next step, along with initiating public health policies and programs, that introduce these strategies to high-risk populations.

References

1. Selye J. The development of the stress theory: stress and heart disease. *Orv Hetil.* 1969;110: 2257-2265.
2. Outlaw F. Stress and coping: the influence of racism on the cognitive appraisal processing of African Americans. *Issues Ment Health Nurs.* 1993; 14:399-409.

3. Anderson NB, Myers HF, Pickering T, Jackson JS. Hypertension in Blacks: psychosocial and biological perspectives, editorial review. *J Hypertens.* 1989;7:161-172.
4. Anderson NB, Myers HF, Pickering T, Jackson JS. Hypertension in Blacks: psychosocial and biological perspectives. *J Hypertens.* 1989;7:161-172.
5. Gillium R. Cardiovascular disease in the United States: an epidemiological overview. In: Saunders E, ed. *Cardiovascular Diseases in Blacks.* Philadelphia, Pa: F A Davis; 1991. 3-14.
6. Maharishi Mahesh Yogi. *On the Bhagavad-Gita A New Translation and Commentary.* Baltimore, Md: Penguin Books Inc; 1967.
7. Wallace RK. Physiological effects of Transcendental Meditation. In: Orme-Johnson D, Farrow J, eds. *Scientific Research on the Transcendental Meditation Program Collected Papers.* Livingston Manor: Maharishi European Research University Press; 1977:38-42.
8. Alexander CN, Cranson RW, Boyer RW, Orme-Johnson DW. Transcendental consciousness: a fourth state of consciousness beyond sleep, dream, and waking. In: Gackenbach J, ed. *Sleep and Dream: A Sourcebook.* New York, NY: Garland; 1987:282-312.
9. Roth R. *Maharishi Mahesh Yogi's Transcendental Meditation.* Washington, DC: Primus; 1994:90-102.
10. Nader T. *Human Physiology-Expression of Veda and the Vedic Literature.* Vlodrop: Maharishi University Press; 1995.
11. Orme-Johnson DW. Autonomic stability and Transcendental Meditation. *Psychosom Med.* 1973;35:341-349.
12. Jevning R, Wallace RK, Beidebach M. The physiology of meditation: a review. *Neurosci Biobehav Rev.* 1992;16:415-424.
13. Eppley K, Abrams A, Shear J. Differential effects of relaxation techniques on trait anxiety: a meta-analysis. *J Clin Psychol.* 1989;957-974.
14. Alexander CN, Robinson P, Rainforth M. Treating alcohol, nicotine and drug abuse through Transcendental Meditation: a review and statistical meta-analysis. *Alcohol Treat Q.* 1994.
15. Alexander CN, Rainforth MY, Gelderloos P. Transcendental Meditation, self-actualization and psychological health: a conceptual overview and statistical meta-analysis. *J Soc Behav Pers.* 1991; 6(5):189-247.
16. Alexander CN, Schneider R, Claybourne M, et al. A trial of stress reduction for hypertension in older African Americans (Part II). *Hypertension.* 1996; 28(1):228-237.
17. Schneider RH, Staggers F, Alexander C, et al. A randomized controlled trial of stress reduction for hypertension in older African Americans. *Hypertension.* 1995;26:820-827.
18. Barnes V, Schneider R, Alexander C, Staggers F, Clayborne B. Randomized trial of stress reduction in older African-American hypertensives: 5 year follow-up in all cause and CVD mortality. Paper presented at: Eleventh Interdisciplinary Conference, International Society on Hypertension in Blacks; 1996; New Orleans, Louisiana.
19. Kondwani KA. *Nonpharmacologic Treatment of Hypertensive Heart Disease in African Americans: A Trial of the Transcendental Meditation Program and a Health Education Program* [dissertation]. Fairfield, Iowa: Maharishi University of Management; 1998.
20. Kondwani KA, Schneider R, Alexander C, et al. Left ventricular mass regression with the Transcendental Meditation technique and a health education program in hypertensive African Americans. *J Soc Behav Pers.* In press.
21. Castillo-Richmond A, Schneider RS, Alexander C, et al. Effects of the Transcendental Meditation Program in the aorta, carotid, and femoral arteries evaluated by ultrasound. *Ethn Dis.* 1998;8(2):287.
22. Castillo-Richmond A, Schneider R, Alexander C, et al. The effects of the stress reduction on carotid atherosclerosis in hypertensive African Americans. *Stroke.* 2000;31:568-573.
23. Lollis C, Kondwani K, Robinson L. Does meditation, anger management and lifestyle modification reduce blood pressure in African-American hypertensives? Paper presented at: 15th Annual International Conference of the International Society for Hypertension in Blacks; 2000; Puerto Rico.
24. Herron RE, Schneider RH, Mandarino JV, Alexander CN, Walton KG. Cost-effective hypertension management: comparison of drug therapies with an alternative program. *Am J Managed Care.* 1996;2(4):427-437.
25. Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.* Washington, DC: National Institutes of Health; 1997. Report No. 98-4080.