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Transcendental Meditation in the prevention and treatment of cardiovascular disease and pathophysiological mechanisms: An evidence-based review

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ABSTRACT

Objectives: Despite advances in modern medicine, cardiovascular disease (CVD) is the leading cause of death in Australia and globally. In a recently published scientific statement on alternative methods to lower blood pressure (BP), the American Heart Association (AHA) reported that the Transcendental Meditation (TM) technique may be considered in clinical practice to lower BP. The AHA statement also reported research that TM may reduce heart attack, stroke and death in CVD patients. This article reviews the background and associated evidence for these effects.
Design and methods: Meta-analyses, systematic reviews and controlled clinical studies on the effects of TM technique on cardiovascular disease and its risk factors were reviewed and the outcomes synthesised.
Results: Clinical trials indicate that the TM technique has a positive impact on pathophysiological mechanisms of CVD; risk factors for CVD including hypertension, psychosocial stress and smoking; surrogate markers for CVD; and CVD clinical events.
Conclusions: The wide range of effects of TM practice on cardiovascular health suggests that the TM technique may be considered in clinical applications for both the prevention and treatment of cardiovascular disease.

Contents

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1. Introduction

Cardiovascular disease (CVD) is the leading cause of death in both developed and developing nations [1]. In 2011, CVD accounted for 31% of all deaths in Australia [2]. Access Economics estimated that in 2009 heart attack and cardiac chest pain cost the nation $18 billion – of which $1.77 billion were direct medical and hospitalisation costs [3].

Psychosocial stress is currently recognised as a major risk factor for coronary heart disease (CHD) [4]. CHD has been linked with stressors such as low socioeconomic status, life events and job stress along with stress responses such as anger, hostility, anxiety and depression. It is interesting to note that positive affect, is protective against 10-year incident CHD, suggesting that preventive strategies may be enhanced not only by reducing depressive symptoms but also by increasing positive affect [5].

Pathophysiological mechanisms by which stress leads to vascular and myocardial damage have been elucidated (see Fig. 1) [6]. They include hyper-activation of the sympathetic nervous system, decreased parasympathetic tone, increased platelet aggregation, oxidative stress, insulin resistance, inflammation and hypothalamic-pituitary-adrenal axis activation. Stress may thus worsen other risk factors and/or directly lead to endothelial damage, vasoconstriction, thrombosis and ultimately myocardial ischaemia and/or infarction and death.

2. Design and methods

We conducted a review of the contemporary published literature on effects of stress reduction through meditation, specifically the Transcendental Meditation technique, on CVD, its pathophysiological mechanisms and risk factors. This meta-synthesis focused on systematic reviews, meta-analyses, randomised controlled trials and other controlled clinical studies. Search criteria included TM and CVD pathophysiological mechanisms (including cardiovascular reactivity, oxidative stress, insulin resistance neuroendocrine factors); CVD risk factors (including hypertension, smoking, hypercholesterolaemia, stress, anxiety, depression, diabetes, metabolic syndrome); surrogate markers of CVD (including carotid intima media thickness, exercise tolerance test); cardiovascular clinical events (including all cause mortality, CVD mortality, myocardial infarction, stroke, acute coronary syndrome, coronary revascularisation).

3. Results

3.1. Neurophysiological effects of meditation

Evidence suggests that different types of meditation techniques produce differing neurophysiological effects. Neuroscientists propose that meditation techniques may be categorised into three broad sets according to type of practice, degree of cognitive control (mental effort), and EEG characteristics: methods of focused attention, open monitoring and automatic self-transcending [7].

Focused attention involves voluntary and sustained attention on a chosen object such as a mantra, the breath, a specific thought or emotion, e.g., compassion or loving kindness (as in Zen meditations). Open monitoring involves non-reactive monitoring of all thoughts, emotions, breathing and body sensations that pass through the awareness from moment to moment (as in mindfulness meditation). Automatic self-transcending involves the automatic transcending of the procedures of the meditation to a

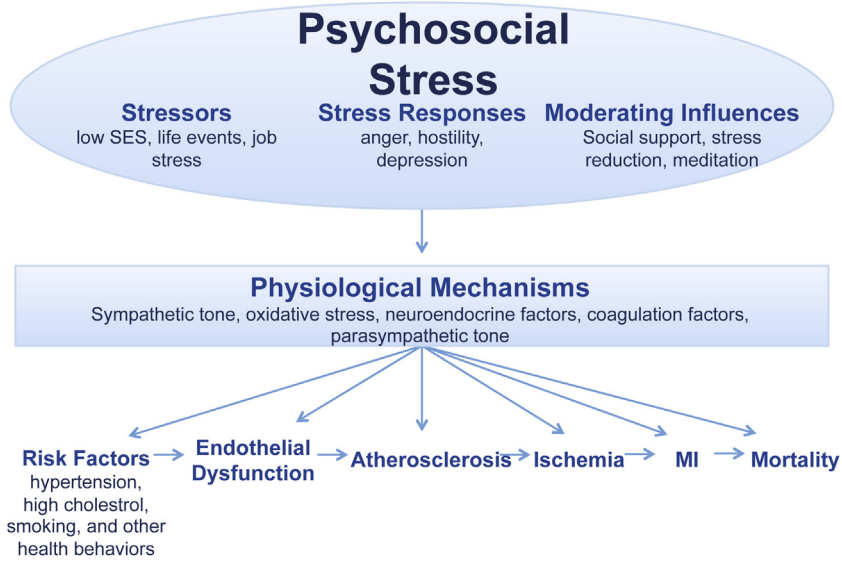

Fig. 1. Pathophysiological mechanisms for stress in CVD.