Role of Meditation in Treating and Preventing CV Disease

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Disclosures

No relevant disclosures
Behavioral Cardiology
Current Advances and Future Directions

Alan Rozanski, MD

Abstract
Growing epidemiological evidence identifies key domains relevant to behavioral cardiology, including health behaviors, emotions, mental mindsets, stress management, social connectedness, and a sense of purpose. Each of these domains exists along a continuum, ranging from positive factors that promote health, to negative factors, which are
Mental and Psychological Risk Factors That Adversely Affect Heart Health
“You need to stop flying and start jogging.”
Meditation and Cardiovascular Risk Reduction
A Scientific Statement From the American Heart Association

Glenn N. Levine, MD, FAHA, Chair; Richard A. Lange, MD, MBA, FAHA, Vice Chair; C. Noel Bairey-Merz, MD, FAHA; Richard J. Davidson, PhD; Kenneth Jamerson, MD, FAHA; Puja K. Mehta, MD, FAHA; Erin D. Michos, MD, MHS, FAHA; Keith Norris, MD; Indranill Basu Ray, MD; Karen L. Saban, PhD, RN, APRN, CNRN, FAHA; Tina Shah, MD; Richard Stein, MD; Sidney C. Smith, Jr, MD, FAHA; on behalf of the American Heart Association Council on Clinical Cardiology; Council on Cardiovascular and Stroke Nursing; and Council on Hypertension.

2017 Statement: ‘Studies of meditation suggest a possible benefit on cardiovascular risk.’

‘Given the low costs and low risks of this intervention, meditation may be considered as an adjunct to guideline-directed cardiovascular risk reduction.’

be performed by those without inherent bias in outcome. (J Am Heart Assoc. 2017;6:e002218. DOI: 10.1161/JAHA.117.002218.)

Key Words: AHA Scientific Statements • cardiovascular disease • cardiovascular risk • meditation • primary prevention • secondary prevention
Lifestyle Modifications for Preventing and Treating Heart Failure

2018 Statement: ‘consider the benefits of yoga and meditation in heart failure’
Best matches for meditation:

The neuroscience of mindfulness meditation.

Mindfulness Meditation for Chronic Pain: Systematic Review and Meta-analysis.

Meditation is associated with increased brain network integration.

Search results

Items: 1 to 20 of 5743

1. Mindfulness- and compassion-based interventions for family carers of older adults: A scoping review.
Murfield J, Moyle W, O'Donovan A.
PMID: 31682112
Similar articles
PubMed.Gov search on “meditation”
MEDITATION AND BLOOD PRESSURE


Modification of the paired H reflex through the transcendental meditation and TM-Sidhi program

R. Keith Wallace, Paul J. Mills, David W. Orme-Johnson, Michael C. Dillbeck, Eliha Jacobe

Abstract
The paired H reflex, considered to be the electrically evoked

Mills P; Iowa National Academy of Science, 1979

2018 Statement: ‘consider the benefits of yoga and meditation in heart failure’
Advances in Heart Failure

Mind-Body Medicine in Chronic Heart Failure
A Translational Science Challenge

Sitaramesh Emani, MD; Philip F. Binkley, MD, MPH
Figure. Proposed remodeling of mind-heart interactions leads to progressive increases in neuroimmune activation in response to stress. In a state such as depression, there is increased sympathetic activity, decreased parasympathetic activity, and activation of proinflammatory pathways. In response to stress, there is further activation of the sympathetic nervous system and proinflammatory pathways and further withdrawal of parasympathetic activity. This results in an environment that promotes sudden cardiac death and vascular and myocardial injury.
DIFFERENT FORMS OF MEDITATION

- **Analytical Meditation**: Focusing on an object or concept and thinking about its deeper meaning.
- **Body Scanning**: Focused attention on different parts of the body. Observing without judgement.
- **Breath Meditation**: Conscious observation of every inhalation and exhalation. Breathing in deep and slow and exhaling slowly.
- **Focus on Love and Gratitude**: Focused attention on a sacred object or being projecting feelings of love and gratitude into your thoughts.
- **Guided Meditation**: Consciously forming mental images of places or situations that you find relaxing. Can be guided in a group or audio recording.
- **Mindfulness Meditation**: Focusing completely and being mindful of the present moment. Focused sensations of your body.
- **Transcendental Meditation**: Focused attention on a learned mantra repeated over and over again, out loud or to yourself.
- **Walking Meditation**: Kinhin in Zen Buddhism, focuses on the subtle movements used to stand and walk.
A Pilot Study Exploring the Effects of a 12-Week T'ai Chi Intervention on Somatic Symptoms of Depression in Patients with Heart Failure

Laura S. Redwine, PhD,1 Ming Tsuang, MD,1 Anna Rusiewicz, PhD,2 Ines Pandzic, MA,1 Stephanie Cammarata, MA,1 Thomas Rutledge, PhD,1 Suzi Hong, PhD,1 Sarah Linke, PhD,1 and Paul J. Mills, PhD1

Abstract

Background: Patients with chronic heart failure (HF) and with elevated depression symptoms are at greater risk of morbidity and mortality. Somatic symptoms of depression are particularly prevalent in HF and are related to worse disease prognosis. T’ai chi practice is related to increased emotional well-being in various clinical populations; however, relatively little is known about t’ai chi’s effects on somatic versus cognitive symptom dimensions of depression in HF.

Purpose: The objective of the study was to measure whether a t’ai chi intervention effectively reduces somatic and/or cognitive symptoms of depression in patients with HF.

Methods: Patients with HF were assigned to either t’ai chi training (n = 16) or a usual-care group (n = 12). At baseline and after the 12-week intervention period, participants were evaluated for changes in depressive symptoms using Beck Depression Inventory (BDI) total scores (BDI-t) and subcategorized scores of BDI-somatic (BDI-s) and BDI-cognitive (BDI-c), and for symptoms of fatigue using the Multidimensional Fatigue Symptom Inventory–Short Form.

Results: Patients with HF in the t’ai chi group compared to the usual-care group had reduced BDI-s (p £ 0.017), but not BDI-c (p = 0.50) scores from pre- to postintervention. Although t’ai chi did not significantly reduce fatigue, changes in physical fatigue (p £ 0.05) were independently associated with changes in BDI-t scores.

Conclusions: T’ai chi practice reduced somatic symptoms of depression, which have been linked to worse prognosis in HF. Reductions in fatigue appear to explain some but not all of the reductions in somatic symptoms of depression.

Introduction

Heart failure (HF) affects between 5 and 6 million North Americans, and rates of new diagnoses are predicted to triple in the next 3 decades as the population ages.1 Comorbid depressive disorders are present in up to 40% of HF patients,2,3 which in turn are associated with increased mortality, clinical events, rehospitalization, and general health care use,4 yet the efficacy of antidepressant therapy in patients with coronary heart disease (CHD) has had only minor effects on reducing depressive symptoms.5 One reason for the lack of depression treatment efficacy in patients with HF may be the heterogeneity of depression as a syndrome in this population.6 Various investigations have attempted to distinguish somatic from cognitive dimensions of depression for patients with CHD,7 and research shows that somatic symptoms of depression are both highly prevalent8 and have a greater relationship with cardiovascular disease prognosis in patients with CHD.9–11 More specifically, patients with HF with elevated somatic depressive symptoms have an increased incidence of mortality over a 3-year follow-up period, while patients with heightened cognitive depressive symptoms do not.6

Research suggests that somatic symptoms such as fatigue and sleep disturbances, which are common in patients with HF,12 may lead to physical inactivity and create a spiraling decline in physical and cardiac function. Recent evidence indicates that physical inactivity may be one mediator of HF.
Effects of Tai Chi Mind-Body Movement Therapy on Functional Status and Exercise Capacity in Patients with Chronic Heart Failure: A Randomized Controlled Trial

Gloria Y. Yeh, MD, MPH, Malissa J. Wood, MD, Beverly H. Lorell, MD, Lynne W. Stevenson, MD, David M. Eisenberg, MD, Peter M. Wayne, PhD, Ary L. Goldberger, MD, Roger B. Davis, ScD, Russell S. Phillips, MD
30 HF patients
%LVEF <40
NYHA I- IV

Quality Of Life

Figure 1. Change in Minnesota Living with Heart Failure quality-of-life scores from baseline to 12 weeks. Means (± SD) are shown in bold. At 12 weeks, patients in the tai chi group reported significantly better quality-of-life (lower scores) as compared with those in the usual care group ($P = 0.001$).
Figure 2. Change in 6-minute walk distance from baseline to 12 weeks. Means (± SD) are shown in bold. At 12 weeks, patients in the tai chi group performed significantly better as compared with those in the usual care group ($P = 0.001$). Imputation methods (last value carried forward) were used for missing 12-week data, affecting 1 patient in the control group.
Table 3. Comparison of the Effects of Tai Chi versus Usual Care Only on Changes in Outcomes during the 12-Week Trial

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Tai Chi (n = 15)</th>
<th>Control (n = 15)*</th>
<th>Between-Group Difference in Change</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>12-Week</td>
<td>Baseline</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean ± SD</td>
<td></td>
<td>Mean (95% Confidence Interval)</td>
<td></td>
</tr>
<tr>
<td>Minnesota Living with Heart Failure score†</td>
<td>43 ± 21</td>
<td>26 ± 23</td>
<td>44 ± 20</td>
<td>52 ± 25</td>
</tr>
<tr>
<td>6-minute walk (m)</td>
<td>327 ± 106</td>
<td>412 ± 116</td>
<td>340 ± 117</td>
<td>289 ± 165</td>
</tr>
<tr>
<td>Peak oxygen uptake (mL/kg/min)</td>
<td>10.5 ± 3</td>
<td>11.4 ± 3</td>
<td>11.1 ± 6</td>
<td>10.4 ± 6</td>
</tr>
<tr>
<td>Serum B-type natriuretic peptide† (pg/mL)</td>
<td>329 ± 377</td>
<td>281 ± 365</td>
<td>285 ± 340</td>
<td>375 ± 429</td>
</tr>
<tr>
<td>Plasma norepinephrine (ng/mL)</td>
<td>1.3 ± 0.7</td>
<td>1.9 ± 2.3</td>
<td>1.2 ± 0.8</td>
<td>1.4 ± 0.7</td>
</tr>
</tbody>
</table>
Tai Chi Exercise in Patients With Chronic Heart Failure:

A Randomized Clinical Trial

Dr Gloria Y. Yeh, MD, MPH, Dr Ellen P. McCarthy, PhD, Dr Peter M. Wayne, PhD, Dr Lynne W. Stevenson, MD, Dr Malissa J. Wood, MD, Dr Daniel Forman, MD, Dr Roger B. Davis, ScD, and Dr Russell S. Phillips, MD

Division of General Medicine and Primary Care, Department of Medicine, Beth Israel Deaconess Medical Center (Drs Yeh, McCarthy, Wayne, Davis, and Phillips), Division for Research and Education in Complementary and Integrative Medical Therapies, Harvard Medical School (Drs Yeh, Wayne, Davis, and Phillips), Cardiovascular Division, Department of Medicine, Brigham and Women’s Hospital (Drs Stevenson and Forman), and Division of Cardiology, Department of Medicine, Massachusetts General Hospital (Dr Wood), Boston, Massachusetts
Reduced depressed mood

no difference in change in 6-min walk distance

Figure 2.
Change in quality of life assessed by the Minnesota Living With Heart Failure Questionnaire score. Limit lines represent SD.

100 HF patients
%LVEF <40
NYHA I- III
Tai Chi led to improvements in cardiac exercise self-efficacy
Tai Chi in Patients With Heart Failure With Preserved Ejection Fraction

Gloria Y. Yeh, MD, MPH; Malissa J. Wood, MD; Peter M. Wayne, PhD; Mary T. Quilty, BS; Lynne W. Stevenson, MD; Roger B. Davis, ScD; Russell S. Phillips, MD; Daniel E. Forman, MD

From the 1Osher Center for Integrative Medicine, Harvard Medical School, Boston, MA; 2Division of General Medicine and Primary Care, Department of Medicine, Beth Israel Deaconess Medical Center, Brookline, MA; 3Division of Cardiology, Massachusetts General Hospital, Boston, MA; 4Division of Preventive Medicine, Brigham and Women’s Hospital, Boston, MA; 5Division of Cardiovascular, Brigham and Women’s Hospital, Boston, MA; 6New England Geriatric Research, Education, and Clinical Center, Veterans Administration Boston Healthcare System, Boston, MA
### TABLE III. Exercise and Functional Performance

<table>
<thead>
<tr>
<th></th>
<th>Tai Chi</th>
<th></th>
<th>Aerobic Exercise</th>
<th></th>
<th>P Value&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>12 Weeks</td>
<td>Baseline</td>
<td>12 Weeks</td>
<td></td>
</tr>
<tr>
<td><strong>Peak exercise (bike)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak VO₂, mL/kg/min</td>
<td>14.5±7</td>
<td>15.2±6</td>
<td>13.1±5</td>
<td>13.0±4</td>
<td>.73</td>
</tr>
<tr>
<td>Exercise duration, min</td>
<td>7.2±6</td>
<td>8.3±6</td>
<td>6.6±2</td>
<td>7.2±3</td>
<td>.81</td>
</tr>
<tr>
<td>Heart rate, bpm</td>
<td>122±29</td>
<td>116±25</td>
<td>119±22</td>
<td>118±24</td>
<td>.95</td>
</tr>
<tr>
<td>Systolic BP, mm Hg</td>
<td>174±15</td>
<td>172±30</td>
<td>198±30</td>
<td>171±28</td>
<td>.18</td>
</tr>
<tr>
<td>Diastolic BP, mm Hg</td>
<td>81±6</td>
<td>79±11</td>
<td>85±13</td>
<td>75±16</td>
<td>.22</td>
</tr>
<tr>
<td>Respiratory exchange ratio</td>
<td>1.15±0.08</td>
<td>1.14±0.04</td>
<td>1.15±0.14</td>
<td>1.14±0.10</td>
<td>.67</td>
</tr>
<tr>
<td>6-Min walk, m</td>
<td>335.4±174</td>
<td>404.2±190</td>
<td>349.7±216</td>
<td>360.1±205</td>
<td>.02</td>
</tr>
<tr>
<td>Time up and go, s</td>
<td>15.9±14</td>
<td>12.7±9</td>
<td>17.8±15</td>
<td>12.8±8</td>
<td>1</td>
</tr>
</tbody>
</table>

Abbreviations: BP, blood pressure; bpm, beats per minute; VO₂, peak oxygen consumption. Data are presented as mean±standard deviation. <sup>a</sup>Comparing the change scores between groups.
MEDITATION

RISK FACTORS
Meditation and blood pressure: a meta-analysis of randomized clinical trials

Lu Shi\textsuperscript{a}, Donglan Zhang\textsuperscript{b}, Liang Wang\textsuperscript{c}, Junyang Zhuang\textsuperscript{d}, Rebecca Cook\textsuperscript{e}, and Liwei Chen\textsuperscript{a}
Effect of meditation interventions on SBP measured by ambulatory blood pressure monitoring: transcendental meditation vs. non-transcendental.
Effect of meditation interventions on DBP measured by ambulatory blood pressure monitoring: transcendental meditation vs. non-transcendental.
Effectiveness of Transcendental Meditation on Functional Capacity and Quality of Life of African Americans with Congestive Heart Failure: A Randomized Control Study

Ravishankar Jayadevappa, PhD, Jerry C. Johnson, MD, Bernard S. Bloom, PhD*, Sanford Nidich, EdD, Shashank Desai, MD, Sumedha Chhatre, PhD, Donna B. Raziano, MD, and Robert H. Schneider, MD

From the Department of Medicine, University of Pennsylvania (RJ, JCJ, BSB, SD, SC); Elder Health Pennsylvania (DBR), Philadelphia, Pennsylvania; Center for Natural Medicine and Prevention, Maharishi University of Management, Fairfield, Iowa (SN, RS).
23 NYHA II & III Patients; %LVEF <40
Effects of Transcendental Meditation

6-min Walk Test

Jayadevappa et al, Ethn Dis. Volume 17
TM also significantly improved:

- SF-36 subscales
- MLHF QoFL
- Depressed mood

↔ BNP
Effects of a mindfulness-based intervention on symptoms and signs in chronic heart failure: A feasibility study

Jonna Norman¹,², Michael Fu³, Inger Ekman¹,², Lena Björck¹,³ and Kristin Falk¹,²
Mindfulness in HF

- reduced fatigue
- reduced symptoms of unsteadiness
- reduced breathlessness/tiredness related to physical functioning

50 HF patients
%LVEF <40
NYHA II - III
Effects of mindfulness-based interventions on health-related outcomes for patients with heart failure: a systematic review.

Zou H¹, Cao X¹, Geng J², Chair SY¹.

Author information

1  The Nethersole School of Nursing, The Chinese University of Hong Kong, China.
2  Cardiology Department, Renmin Hospital of Wuhan University, China.
Systematic Review Mindfulness in 467 HF patients

- reduced depression
- reduced anxiety
- improved quality of life
- physical functioning - inconsistent
Meditation reduces sympathetic activation and improves the quality of life in elderly patients with optimally treated heart failure: a prospective randomized study.

Curiti JA¹, Bocchi E, Freire JO, Arantes AC, Braga M, Garcia Y, Guimarães G, Fo WJ.

Author information

1 Geriatrics Service, Hospital das Clínicas, São Paulo University Medical School, São Paulo, Brazil. jaec@terra.com.br
19 HF PATIENTS MEDITATED FOR 12 WEEKS; 30 MINUTES 2X PER DAY

Reduced norepinephrine

Improved MLWHFQ

Improved exercise performance

No change %LVEF.
A Systematic Review of Relaxation, Meditation, and Guided Imagery Strategies for Symptom Management in Heart Failure

Kristine L. Kwekkeboom, PhD, RN [Professor] and Lisa C. Bratzke, PhD, RN, ANP-BC [Assistant Professor]
University of Wisconsin-Madison School of Nursing
Meditation interventions among heart failure patients: An integrative review

Jennifer Viveiros¹, Brianna Chamberlain¹, Aminda O’Hare² and Kristen A Sethares¹
>425 HF patients & controls from 9 studies; meditation practice improved:

- depression
- social support
- quality of life
- 6-minute walk test
- dyspnea
- sleep
- pain
- %LVEF (NS)
Effects of a Randomized Controlled Trial of Transcendental Meditation on Components of the Metabolic Syndrome in Subjects With Coronary Heart Disease

Maura Paul-Labrador, MPH; Donna Polk, MD, MPH; James H. Dwyer, PhD†; Ivan Velasquez, MD; Sanford Nidich, PhD; Maxwell Rainforth, PhD; Robert Schneider, MD; C. Noel Bairey Merz, MD
**Improved Insulin Resistance**

*16 weeks meditation* RCT in 103 CHD Patients

**Figure.** Homeostasis model assessment (HOMA) as a measure of insulin resistance and blood glucose and insulin levels by intervention group. We
2,579 participants from the *Rotterdam Study*. 15% participated in mind-body practices and had:

- lower body mass index
- lower triglyceride levels
- lower fasting glucose levels
- less metabolic syndrome
CLINICAL
Outcomes?
Long-Term Effects of Stress Reduction on Mortality in Persons $\geq 55$ Years of Age With Systemic Hypertension

Robert H. Schneider, MD, Charles N. Alexander, PhD,* Frank Staggers, MD, Maxwell Rainforth, PhD, John W. Salerno, PhD, Arthur Hartz, MD, Stephen Arndt, PhD, Vernon A. Barnes, PhD, and Sanford I. Nidich, EdD
202 African-American and Caucasian men and women with CHD

Mean follow-up 7.5 years.

23% all cause mortality

30% CV mortality

**FIGURE 1.** Kaplan-Meier survival curves for all-cause mortality for subjects who completed post-testing in the original studies (relative risk 0.77, p = 0.04).
Stress Reduction in the Secondary Prevention of Cardiovascular Disease
Randomized, Controlled Trial of Transcendental Meditation and Health Education in Blacks

Robert H. Schneider, MD, FACC; Clarence E. Grim, MD;
Maxwell V. Rainforth, PhD; Theodore Kotchen, MD; Sanford I. Nidich, EdD;
Carolyn Gaylord-King, PhD; John W. Salerno, PhD; Jane Morley Kotchen, MD, MPH;
Charles N. Alexander, PhD†
RCT on CVD Clinical Events
Mortality, MI and Stroke in CHD Patients

201 African-American men and women with CHD
Cardiac Rehabilitation and Wellness
Effects of cardiac rehabilitation with and without meditation on myocardial blood flow using quantitative positron emission tomography: A pilot study.

Bokhari S¹, Schneider RH², Salerno JW³, Rainforth MV³, Gaylord-King C³, Nidich SI³.

Author information

1 Division of Cardiology, Department of Medicine, Columbia University Medical Center, New York, NY, USA.
56 CHD Patients; 12-week intervention

Myocardial Flow Reserve (ml/min/g) by PET

- TM + CR
- CR alone
- TM alone
- usual care

Effect Size

MFR

Effect Size
Myocardial Flow Reserve (ml/min/g) by PET

- Combined TM
- No TM

Effect size

MFR

Effect size
Take home message
<table>
<thead>
<tr>
<th>MBI Practice</th>
<th>Improved Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tai chi</td>
<td>Depression</td>
</tr>
<tr>
<td></td>
<td>Quality of life</td>
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<tr>
<td></td>
<td>Exercise tolerance</td>
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<tr>
<td>Meditation</td>
<td>6-min walk</td>
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<tr>
<td></td>
<td>Depression</td>
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<td></td>
<td>Hospitalizations</td>
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</tbody>
</table>

**TABLE 4**  Mind-Body Techniques and Associated Improvements in Randomized Controlled Trials

- Quality of Life
- Blood pressure
- Clinical events in HF
Thank you.