Clinical Applications of Integrative Medicine for the Geriatric Population

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Professor of Medicine
Program Director
Billings Clinic Internal Medicine Residency
DISCLOSURE

Relevant Financial Relationship(s)
None

Off Label Usage
None
Learning Objectives

• Understand key concepts and evolution of Integrative Medicine
• Reflect on the scientific basis of Integrative Medicine as it applies to clinical practice
• Consider ways to incorporate evidence-based therapies for the geriatric patient population
CAM

HOLISTIC

COMPLEMENTARY

INTEGRATIVE

ALTERNATIVE
Curing Pills

PLUM FLOWER BRAND

Traditional Chinese Formula

30 Capsules
Net Wt. 0.81 oz.
Herbs and the FDA

Dietary Supplement Health and Education Act, 1994

- Reclassified herbs as “dietary supplements”
- Separate classification from either food or drugs
- Can be marketed with suggested dosages
- Not required to undergo pre-market testing for
  - Safety
  - Efficacy
# Quality control?

<table>
<thead>
<tr>
<th>Product (listed alphabetically)</th>
<th>Ginseng per capsule</th>
<th>Ginsenosides per capsule</th>
<th>Concentration (percentage ginsenoside)</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Ginseng</td>
<td>250 m</td>
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<tr>
<td>Ginsana (extract)</td>
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<tr>
<td>Herbal Choice Ginseng-7 (extract)</td>
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<td>7</td>
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<tr>
<td>Walgreen's Gin-zing (extract)</td>
<td>100</td>
<td>7.6</td>
<td>0</td>
</tr>
</tbody>
</table>

1. According to label.  
2. Based on six major ginsenosides. Estimates for two other ginsenosides, if added, would boost totals only slightly and not change variation in concentrations.
component of what are called traditional Chinese medicines. Asian patent medicines comprise multiple products, including herbs, plants, animal parts, and minerals, which are formulated into tablets, pills, or liquids for ease of use. we gained acceptance by the American public as a form of alternative medicine. However, many patent medicines manufactured in Asian countries contain toxic ingredients, such as heavy metals, as well as prescription drugs or identified on the label. Some have caused serious illness in unsuspecting consumers.

Food and Drug Branch, initiated a study to screen imported Asian patent medicines for undeclared pharmaceuticals and heavy-metal contamination, using gas chromatography–mass spectrometry and atomic-absorption methods. Our for these products, educate the public, the herbal industry, and the medical community about the potential danger of Asian patent medicines, and provide objective information about toxicity.

collected from California retail herbal stores, 14 had labels that declared pharmaceutical ingredients, and 3 had insufficient sample amounts. Of the remaining 243 products, 17 (7 percent) contained undeclared pharmaceuticals. The codeine, chlorpheniramine, methyltestosterone, and phenacetin. A total of 251 products were analyzed for lead, arsenic, and mercury; 9 other samples, including the 3 noted above, were insufficient for this analysis. Twenty-four products

“Of the 260 products we investigated, at least 83 (32 percent) contained undeclared pharmaceuticals or heavy metals”

Richard J. Ko, Pharm.D., Ph.D.
California Dept of Health Services
FDA and Good Manufacturing Practices

DS must be manufactured consistently:

- Identity
- Purity
- Strength
- Composition

• Effective
  – 6/08 for large companies
  – 6/09 for companies with <500 employees
  – 6/10 for companies with < 20 employees

FDA CGMP Final Rule
06/22/07
Dietary Supplements

• Risks to consider
  – Drug-herb interactions
  – Herb side effects/toxicity
  – Delay of effective treatment
  – Deplete resources
  – False hope
Herb-Drug Interactions

- **Scope of the issue**
  - N = 1795 Mayo Clinic patients, 6 specialty clinics
    - 40% used DS
    - 107 potential interactions
      - 68% of potential interactions.
        - garlic, valerian, kava, ginkgo, and St John's wort
      - 94% of potential interactions.
        - antithrombotics, antidepressants, antidiabetic agents
    - No serious adverse events

Sood 2008
Dietary Supplements

• Health Care Team
  – Patients may be reluctant to discuss use
    • Fear of censure
    • Different beliefs re: herbs
  – Non-judgmental questions critical
  – Easy access information
A Heart transplantation

Hypericin (900μg/three times daily)

ISHT 3A

April 1998
March 1998
April 1998
April 1999
May 1999

Cyclosporine (µg/L)

B Heart transplantation

Hypericin (900 µg/three times daily)

ISHT 2

July 1997
February 1999
March 1999
April 1999
May 1999

Time (month/year)
Health Care, Education and Research

Complementary and Alternative Medicine
(Treatments not presently considered conventional)

Complementary medicine
(Used together with Conventional Medicine)

Alternative medicine
(Used in place of conventional medicine)

Complementary and Alternative Medicine
(Treatments not presently considered conventional)

Conventional Medicine

Integrative Medicine
Curing versus Healing

Conventional Medicine
- Curing, elimination of disease and prevention of death
- Elimination of symptoms
- Specializing/ compartmentalizing

Integrative Medicine
- Healing model means to become whole
- Harmony of body, mind and spirit
- Body’s innate ability to heal itself, towards wholeness
CAM Use by U.S. Adults and Children

- Adults (2002): 36.0%
- Adults (2007): 38.3%
- Children (2007): 11.8%

Barnes, 2008
Diseases/Conditions for Which CAM Is Most Frequently Used Among Adults – 2007

- Back pain: 17.1%
- Neck pain: 5.9%
- Joint pain: 5.2%
- Arthritis: 3.5%
- Anxiety: 2.8%
- Cholesterol: 2.1%
- Head or chest cold: 2.0%
- Other musculoskeletal: 1.8%
- Severe headache or migraine: 1.6%
- Insomnia: 1.4%
Household Usage of CAM

- Chiropractic: 32%
- Massage therapy: 27%
- Acupuncture: 6%
- Herbs/Dietary supps: 30%
- Hypnosis/Guided imagery: 4%
- Acupressure: 5%
- Yoga/Tai Chi: 13%

62% one or more

Base: Total Sample (n=100); Survey Questions: #18
CAM Use in Hospitals

- **2010 Survey of 714 US hospitals**
  - 42% offer one or more CAM therapies
    - Up from 37% in 2007
  - **Most common therapies**
    - Pet therapy
    - Massage therapy
    - Music/Art therapy
    - Guided imagery/relaxation training

Ananth 2011
Funding for Research by NIH

NCCAM 2014
Impact of Prevention, Wellness, Life Style, and Complementary Medicine on Health and Wellness

- Well-coordinated inpatient integrative care by holistic nurses, licensed acupuncturists and massage therapists at Abbott Northwestern Hospital was estimated to diminish hospital costs $2000 per patient.
- Blue Cross Blue Shield of Tennessee found that patients with low back pain who directly access chiropractors cost 20%-40% less.
- A study out of the Netherlands found that patients of general practitioners who used a limited set of CAM treatments were healthier and cost the system 7% less.
- Costs for insureds with significant disease burdens in Washington State who used licensed CAM practitioners was $1420 less than those who didn't use them.
- Employees of Canada Post with elevated cardiovascular risk who used naturopathic doctors saved their employers an estimated $1021 less per year.
- An integrative wellness program at Duke saved an estimated $2200 per employee.
Learning Objectives

• Understand key concepts and evolution of Integrative Medicine
• Reflect on the scientific basis of Integrative Medicine as it applies to clinical practice
• Consider ways to incorporate evidence-based therapies for the geriatric patient population
The “Average” Geriatric Client

Americans are overall living longer
14% are still in labor force (Increased from 9% since 2000)
36 million are still driving

Health statistics for the elderly:
The average 75 year old has 3 chronic conditions
Uses 5 prescription drugs

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<td>Cancer</td>
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Integrative Medicine Example

Hypertension
**Principles of Hypertension Treatment**
- Treat to BP <140/90 mmHg or BP <130/80 mmHg in patients with diabetes or chronic kidney disease.
- Majority of patients will require two medications to reach goal.

**Algorithm for Treatment of Hypertension**

**Lifestyle Modifications**
- Not at Goal Blood Pressure (<140/90 mmHg)
  - (<130/80 mmHg for patients with diabetes or chronic kidney disease)
  - See Strategies for Improving Adherence to Therapy

**Initial Drug Choices**

- **Without Compelling Indications**
  - Stage 1 Hypertension (SBP 140–159 or DBP 90–99 mmHg)
    - Thiazide-type diuretics for most. May consider ACEI, ARB, BB, CCB, or combination.
  - Stage 2 Hypertension (SBP ≥160 or DBP ≥100 mmHg)
    - 2-drug combination for most (usually thiazide-type diuretic and ACEI, or ARB, or BB, or CCB).

- **With Compelling Indications**
  - Drug(s) for the compelling indications
    - See Compelling Indications for Individual Drug Classes
    - Other antihypertensive drugs (diuretics, ACEI, ARB, BB, CCB) as needed.

**Not at Goal Blood Pressure**
- Optimize dosages or add additional drugs until goal blood pressure is achieved. Consider consultation with hypertension specialist.
  - See Strategies for Improving Adherence to Therapy
Hypertension Prevalence (140/90 mmHg or Treatment), African and European Descent Populations; Ages 35–64, Age Adjusted

Cooper et al. BMC Medicine 2005
Risk Factors

Unmodifiable
- Age
- Gender
- Genetics
- Race

Modifiable
- Diet
- Obesity
- Activity
- Lifestyle
Time Spent Watching Television vs. Obesity Rate by Country

Source: Organization for Economic Cooperation and Development Society
Diet & HTN

• DASH Diet
  • 2000 Calories/Day
    – 7-8 servings of grains
    – 4-5 servings of fruits
    – 4-5 servings of vegetables
    – 2-3 servings of low-fat dairy products
    – 2 or less servings of lean meats
    – Snacks and sweets are limited to 5 per week
• Using the DASH diet significantly lowers blood pressure compared to a control diet after 1-2 months in people with or without hypertension
  • Svetkev et al. Arch Intern Med 1999
  • Conlin et al. Am J. Hypertens 2000
• Combining the DASH diet with a sodium-reduced diet is more effective than either diet alone
  • Sacks et al. NEJM 2001
Dietary Supplements & Hypertension
Omega-3 Fatty Acids

- Fish, Plant and nuts oils
  - Alpha-linolenic acid (ALA)
  - Docosahexanoic acid (DHA)
  - Eicosapentaenoic acid (EPA)
  - Fish Oil
Omega-3 Fatty Acids - ALA

• Dietary ALA is associated with a lower prevalence of hypertension in the NHLBI Family Heart Study.

• Limited study data
Omega-3 Fatty Acids

- DHA & EPA are thought to directly have hypotensive effects
- 4 grams/day RTC (Fish Oil)
  - Lowers BP -6 mm systolic/-5 mm diastolic
    - Lowers BP -3.8 mm systolic/-2.0 mm diastolic
- Risk of medication interactions
Coenzyme Q10

• Promotes vasodilation
• RTC
  – 100mg BID x 12 weeks lowers BP (-6.1mm/-2.9mm) in patients with known HTN
  – 60mg BID Lowers BP in patients with known HTN

• Long-term safety in high doses unknown
• May lower blood sugar
Cocoa Polyphenols

• Flavenoids in chocolate stimulate formation of nitric oxide
  – Dark Chocolate are higher in cocoa polyphenols
  – 46-105g chocolate = 214-500mg polyphenols
  – Can lower BP: -5mm systolic/-3mm diastolic
    • Taubert et al. JAMA 2003;290:1029-30
    • Taubert et al. Arch Intern Med 2007;167:626-34

• High compliance
  – 40g chocolate = 180 calories
Garlic

• Meta-analysis
  – Effect of garlic on blood pressure: a systematic review and meta-analysis
    • Reid et al. BMC Cardiovasc Disord. 2008 Jun 16;8:13
  – 11 studies – RCT
  – Mean decrease in the hypertensive subgroup
    8.4 +/- 2.8 mm Hg for SBP (n = 4; p < 0.001)
    7.3 +/- 1.5 mm Hg for DBP (n = 3; p < 0.001)
Lifestyle & Hypertension

Emotional, Mental & Spiritual Interventions
Stress & HTN

- Mental Stress may be linked to development and maintenance of Hypertension
- CARDIA study suggests that individuals with increases in BP due to stress are predictive of HTN

Boone JL. Prim Care. 1991 Sep;18(3):623-49
Mathews KA. Circulation. 2004 Jul 6;110(1):74-8
Meditation

- Meta-analysis
- 9 studies
- 8-52 weeks
- Decreased BP
  - ~4.7mm Hg systolic
  - ~3.2mm Hg diastolic

Blood Pressure Response to Transcendental Meditation: A Meta-analysis

James W. Anderson, Chunxu Li, and Richard J. Krystico

**BACKGROUND**

Prior clinical trials suggest that the Transcendental Meditation technique may decrease blood pressure of normotensive and hypertensive individuals but study-quality issues have been raised. This study was designed to assess effects of Transcendental Meditation on blood pressure using objective quality assessments and meta-analyses.

**METHODS**

PubMed and Cochrane databases through December 2005 were searched. Randomized, controlled trials comparing blood pressure responses to the Transcendental Meditation technique with a control group were included. Primary outcome measures were changes in systolic and diastolic blood pressure. A specific rating system (0-26 points) was used to evaluate studies and random-effects models were used for meta-analyses.

**RESULTS**

Nine randomized, controlled trials met eligibility criteria. Study quality scores ranged from low (score, 7) to high (16) with three studies of high quality (15 or 16) and three of acceptable quality (11 or 12). The random-effects meta-analysis model for systolic and diastolic blood pressure, respectively, indicated that Transcendental Meditation compared to control, was associated with the following changes: ~4.7mm Hg (95% confidence interval (CI), 2.4 to 6.9mm Hg) and ~3.2mm Hg (95% CI, 1.5 to 4.9mm Hg). Subgroup analyses of hypertensive groups and high-quality studies showed similar reductions.

**CONCLUSIONS**

Chronic stress may play an important role in initiating and maintaining hypertension for many individuals. Behavioral approaches to reduce chronic stress and lower blood pressure have been evaluated in modern clinical studies for 40 years. Many clinical trials have examined the effects of cognitive behavioral techniques on blood pressure. A number of randomized clinical trials have evaluated the effects of the Transcendental Meditation technique on blood pressure, the quality and potential bias of these previous studies have been criticized. Two recent high-quality randomized controlled trials have evaluated the effects of Transcendental Meditation on blood pressure of hypertensive subjects, but there have been no quantitative meta-analyses of all these studies.

Many agencies and reviewers have proposed rating systems to assess the methodological quality of randomized controlled trials. Recently, the Agency for Healthcare Research and Quality (US, Department of Health and Human Services) reviewed 20 scales, 11 checklists, 10 rating systems, and 8 other guidance documents related to randomized controlled trials. They recommended the use of a scale or checklist tailored to the intervention under analysis to include the following elements: study population, randomization, blinding, intervention, outcomes, statistical analysis, and funding or sponsorship. The scale proposed by Jadad and colleagues addressing randomization, blinding, and dropout has been widely used. A description of the intervention is especially important for non-pharmacological trials and rigorous attention to blood pressure measurements is essential for hypertension trials.

The objective of this study was to identify randomized controlled trials assessing effects of Transcendental Meditation related to blood pressure, develop an objective assessment for non-pharmacological trials related to blood pressure, and perform meta-analyses of randomized, controlled trials assessing the effects of the Transcendental Meditation program related to blood pressure.

**METHODS**

Data sources and services. We performed a thorough literature search using the Cochrane Library and PubMed (National Library of Medicine, Bethesda, MD) through...
Meditation

- Meta-analysis
- 107 studies
  - Relaxation
  - Meditation
  - Biofeedback
  - Stress Management
- No significant results:
  - Relaxation, Biofeedback, Stress Management
- Meditation improved BP
  - ~5.0mm Hg systolic
  - ~2.8mm Hg diastolic

Stress Reduction Programs in Patients with Elevated Blood Pressure: A Systematic Review and Meta-analysis

Maxwell V. Rainforth, PhD, Robert H. Schneider, MD, Sanford L. Nidich, EdD, Carolyn Gaylord-King, PhD, John W. Salerno, PhD, and James W. Anderson, MD

Abstract

Substantial evidence indicates that psychosocial stress contributes to hypertension and cardiovascular disease (CVD). Previous meta-analyses of stress reduction and high blood pressure (BP) were outdated and/or methodologically limited. Therefore, we conducted an updated systematic review of the published literature and identified 107 studies on stress reduction and BP. Seventeen trials with 23 treatment comparisons and 960 participants with elevated BP met criteria for well-designed randomized controlled trials and were replicated within intervention categories. Meta-analysis was used to calculate BP changes for biofeedback, -0.8/2.0 mm Hg (P = NS); relaxation-assisted biofeedback, +4.3/-2.4 mm Hg (P = NS); progressive muscle relaxation, -1.9/1.4 mm Hg (P = NS); stress management training, -2.3/-1.3 mm (P = NS), and the Transcendental Meditation program, -5.0/-2.8 mm Hg (P = 0.002/0.02). Available evidence indicates that among stress reduction approaches, the Transcendental Meditation program is associated with significant reductions in BP. Related data suggest improvements in other CVD risk factors and clinical outcomes.

Introduction

The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) recommends lifestyle modifications for prevention and treatment of hypertension [1]. Lifestyle modifications are recommended as sole therapy when blood pressure (BP) is greater than 120/80 mm Hg and less than 140/90 mm Hg (prehypertension), and as adjunctive therapy when blood pressure is equal to or greater than 140/90 mm Hg (stage I or II hypertension). Thus the first line of treatment for high BP is modifying lifestyle risk factors, including recommendations about weight, physical activity, and dietary intake of sodium, fruits, vegetables, saturated and total fats, and alcohol [1].

Another lifestyle risk factor that has been shown to contribute to high blood pressure is psychosocial stress [2]. Yet, the JNC 7 guidelines do not include recommendations for patients to reduce stress. However, the 2007 Canadian Hypertension Education Program recommends considering stress reduction intervention for normotensive and hypertensive patients [3].
Yoga & HTN

- 3 randomized trials
- Systems include meditation
  - 8 weeks
  - 2/3 demonstrated improvement BP
  - Also demonstrated decrease BMI
The “Average” Geriatric Client

Americans are overall living longer
14% are still in labor force (Increased from 9% since 2000)
36 million are still driving

Health statistics for the elderly:
The average 75 year old has 3 chronic conditions
Uses 5 prescription drugs

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</table>
Between 25% and 50% of community-dwelling elderly report significant pain problems.

Low back pain – most common cause of disability in the US- affecting up to 75% of Americans at one point.

Negative impact on the health and quality of life.

Nociceptive, neuropathic, mixed.

America’s Opioid epidemic and health care impact.
Integrative Medicine in Geriatrics

- Biologic Based Therapies
- Mind Body Medicine
- Energy Medicine
- Manipulative and Body Based Practices
A Mind-Body Program for Older Adults With Chronic Low Back Pain
A Randomized Clinical Trial

Natalia E. Morone, MD, MS; Carol M. Greco, PhD; Charity G. Moore, PhD; Bruce L. Rollman, MD, MPH; Bridget Lane, MA; Lisa A. Morrow, PhD; Nancy W. Glynne, PhD; Debra K. Weiner, MD

Single-blind, Randomized clinical trial
Mind-body program (n=140) vs. Health education program (n=142)

Mean age 75 (intervention), 74 (Control)
Functional limitations due to chronic low back pain (RMD questionnaire)

8 week program followed by 6 monthly sessions
  Intervention: Mindfulness-based Stress Reduction program
  Control: 10 keys to Healthy Aging stress reduction program

Outcomes: at 8 weeks and 6 months
  Score on the Roland and Morris Disability Questionnaire
  Pain on Numeric Pain rating scale
  Quality of life
Acupuncture and Chronic Pain
Meta-analysis and Systematic Reviews

• Back pain
  – Lumbar spinal stenosis – reduced pain
  – Chronic LBP – reduced pain, improved function
  – Chronic LBP – decreased pain, disability
  – Chronic LBP, HA – reduced pain (acupressure)
  – Acute low back pain – decreased pain

Acupuncture and Chronic Pain
Meta-analysis and Systematic Reviews

• Beneficial effects in patients with:
  • Knee OA
  • Cancer
  • Fibromyalgia
  • Chronic pelvic pain
  • Peripheral neuropathy
  • Myofascial pain
  • MS

Massage and Chronic Pain

• Systematic Review of Systematic Reviews of massage therapy for LBP

• Nine Systematic Reviews
  – Effective vs. placebo
  – Effective vs. relaxation therapy
    • Most results short term
    • Primary data quality “weak”
  – Conflicting data vs. standard care, acupuncture

Kumar, Int J Gen Med, 2013
Massage and Chronic Pain

• Systematic Review and Meta-Analysis of massage therapy for neck and shoulder pain
• 12 high quality studies, N = 271
  – Reduced neck and shoulder pain
  – Not significant difference from active therapies
  – No improvement in functional status

Kong, Evid Based CAM, 2013
### Follow-up effects

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Experimental group</th>
<th>Control group</th>
<th>Standardised mean difference</th>
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<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Total</td>
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<tr>
<td>1.1.1. Neck Pain</td>
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<td></td>
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<tr>
<td>Irnich 2001</td>
<td>14.4</td>
<td>21.9</td>
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<tr>
<td>Cen 2003</td>
<td>19.03</td>
<td>10.22</td>
<td>9</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>68</td>
<td></td>
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</tr>
<tr>
<td>Heterogeneity: $\tau^2 = 0$; $\chi^2 = 0.14$, df = 1 ($P = 0.71$); $I^2 = 0%$</td>
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<tr>
<td>Test for overall effect: $Z = 0.5$ ($P = 0.62$)</td>
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<tr>
<td>1.1.2. Shoulder Pain</td>
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<tr>
<td>Dyson-Hudson 2001</td>
<td>37.1</td>
<td>32.99</td>
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<td>Mok 2004</td>
<td>14.6</td>
<td>6.91</td>
<td>51</td>
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<tr>
<td>Buttagat 2011</td>
<td>4.5</td>
<td>1.28</td>
<td>10</td>
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<tr>
<td>Subtotal (95% CI)</td>
<td>70</td>
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<tr>
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<tr>
<td>Test for overall effect: $Z = 3.01$ ($P = 0.003$)</td>
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Mind-Body Therapies And Chronic Pain

- Meta-analysis
- 13 studies
- N = 1092
- Reduced Pain
  Symptom severity
  Depression
  Anxiety
- Improved QOL

Mindfulness-Based Therapies in the Treatment of Somatization Disorders: A Systematic Review and Meta-Analysis

Shaheen E. Lakhani, Kerry L. Schofield
Global Neuroscience Initiative Foundation, Los Angeles, California, United States of America

Abstract

**Background:** Mindfulness-based therapy (MBT) has been used effectively to treat a variety of physical and psychological disorders, including depression, anxiety, and chronic pain. Recently, several lines of research have explored the potential for mindfulness-therapy in treating somatization disorders, including fibromyalgia, chronic fatigue syndrome, and irritable bowel syndrome.

**Methods:** Thirteen studies were identified as fulfilling the present criteria of employing randomized controlled trials to determine the efficacy of any form of MBT in treating somatization disorders. A meta-analysis of the effects of mindfulness-based therapy on pain, symptom severity, quality of life, depression, and anxiety was performed to determine the potential of this form of treatment.

**Findings:** While limited in power, the meta-analysis indicated a small to moderate positive effect of MBT (compared to wait-list or support group controls) in reducing pain (SMD = −0.21, 95% CI: −0.37, −0.03; p < 0.05), symptom severity (SMD = −0.40, 95% CI: −0.54, −0.26; p < 0.001), depression (SMD = −0.23, 95% CI: −0.40, −0.07, p < 0.01), and anxiety (SMD = −0.20, 95% CI: −0.42, 0.02, p = 0.07) associated with somatization disorders, and improving quality of life (SMD = 0.39, 95% CI: 0.19, 0.59; p < 0.001) in patients with this disorder. Subgroup analyses indicated that the efficacy of MBT was most consistent for irritable bowel syndrome (p < 0.001 for pain, symptom severity, and quality of life), and that mindfulness-based stress reduction (MBSR) and mindfulness-based cognitive therapy (MBCT) were more effective than eclectic/unspecified MBT.

**Conclusions:** Preliminary evidence suggests that MBT may be effective in treating at least some aspects of somatization disorders. Further research is warranted.
Symptom Severity

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental</th>
<th>Control</th>
<th>Std. Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Total</td>
</tr>
<tr>
<td>1.2.1 FM</td>
<td>Astin et al 2003</td>
<td>48.8</td>
<td>15.4</td>
</tr>
<tr>
<td></td>
<td>Carson et al 2010</td>
<td>35.49</td>
<td>17.61</td>
</tr>
<tr>
<td></td>
<td>Goldenberg et al 1994</td>
<td>51.1</td>
<td>18.89</td>
</tr>
<tr>
<td></td>
<td>Schmidt et al 2011</td>
<td>4.9</td>
<td>1.74</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td><strong>174</strong></td>
<td><strong>156</strong></td>
<td>41.9%</td>
</tr>
</tbody>
</table>

Heterogeneity: Chi² = 3.44, df = 3 (P = 0.33); I² = 13%
Test for overall effect: Z = 1.95 (P = 0.05)

1.2.2 IBS

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental</th>
<th>Control</th>
<th>Std. Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Total</td>
</tr>
<tr>
<td>Gaylord et al 2011</td>
<td>170.18</td>
<td>114.19</td>
<td>36</td>
</tr>
<tr>
<td>Ljotsson et al 2010</td>
<td>32.4</td>
<td>12.1</td>
<td>42</td>
</tr>
<tr>
<td>Zernicke et al 2012</td>
<td>169.4</td>
<td>125.9</td>
<td>43</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td><strong>121</strong></td>
<td><strong>129</strong></td>
<td>30.5%</td>
</tr>
</tbody>
</table>

Heterogeneity: Chi² = 6.30, df = 2 (P = 0.04); I² = 68%
Test for overall effect: Z = 5.34 (P < 0.00001)

1.2.3 General

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental</th>
<th>Control</th>
<th>Std. Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Total</td>
</tr>
<tr>
<td>Fjorback et al, 2012</td>
<td>69.7</td>
<td>9.8</td>
<td>57</td>
</tr>
<tr>
<td>Rimes et al 2011</td>
<td>21.3</td>
<td>6.2</td>
<td>15</td>
</tr>
<tr>
<td>Sampall et al 2009</td>
<td>10.3</td>
<td>5.93</td>
<td>50</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td><strong>122</strong></td>
<td><strong>105</strong></td>
<td>27.6%</td>
</tr>
</tbody>
</table>

Heterogeneity: Chi² = 13.03, df = 2 (P = 0.001); I² = 85%
Test for overall effect: Z = 2.49 (P = 0.01)

**Total (95% CI)**

<table>
<thead>
<tr>
<th>Mean</th>
<th>SD</th>
<th>Total</th>
<th>Weight</th>
<th>IV, Fixed, 95% CI</th>
<th>IV, Fixed, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>417</td>
<td>390</td>
<td>100.0%</td>
<td>-0.40 [-0.54, -0.26]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Chi² = 30.83, df = 9 (P = 0.0003); I² = 71%
Test for overall effect: Z = 5.52 (P < 0.000001)
Test for subgroup differences: Chi² = 8.06, df = 2 (P = 0.02), I² = 75.2%
Mind-Body Therapies And Chronic Pain

• Critical Review – Mindfulness-based interventions for chronic pain patients
  • MBSR, ACT, mindfulness meditation
  • 16 studies, N = 1404
    • Significant decrease in pain intensity
    • Reductions “generally well maintained”

“Findings suggest that MBI’s decrease the intensity of pain for chronic pain patients”

Yoga and Chronic Pain

• Systematic-review and Meta-analysis of yoga for MS disorders
  – LBP, OA, RA, fibromyalgia
• 17 RCT’s (n = 1,626)
• Results
  – Improved function – LBP, fibro
  – Improved pain – OA, RA, LBP
  – Improved psychosocial outcomes

Ward, Musculoskeletal Care, 2013
Yoga and Chronic Pain

- Systematic-review and Meta-analysis of yoga for LBP
- 10 RCT’s (n = 967)
- “Strong evidence”:
  - Short term effects:
    • Pain, disability, global improvement
  - Long term effects
    • Pain, disability
- No serious adverse effects

# Long term effects

## Pain

<table>
<thead>
<tr>
<th>Study</th>
<th>Yoga Mean</th>
<th>Yoga SD</th>
<th>Yoga Total</th>
<th>Control Mean</th>
<th>Control SD</th>
<th>Control Total</th>
<th>Weight</th>
<th>Std. Mean Difference</th>
<th>Std. Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saper et al., 2009&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.9</td>
<td>0.6</td>
<td>15</td>
<td>4.5</td>
<td>1.2</td>
<td>15</td>
<td>9.9%</td>
<td>-0.62 [-1.35, 0.12]</td>
<td></td>
</tr>
<tr>
<td>Sherman et al., 2011</td>
<td>3.59</td>
<td>2.27</td>
<td>92</td>
<td>3.8</td>
<td>2.2</td>
<td>45</td>
<td>24.5%</td>
<td>-0.09 [-0.45, 0.26]</td>
<td></td>
</tr>
<tr>
<td>Tilbrook et al., 2011&lt;sup&gt;a&lt;/sup&gt;</td>
<td>21.75</td>
<td>13.89</td>
<td>127</td>
<td>23.16</td>
<td>12.28</td>
<td>138</td>
<td>32.4%</td>
<td>-0.11 [-0.35, 0.13]</td>
<td></td>
</tr>
<tr>
<td>Williams et al., 2005</td>
<td>0.6</td>
<td>1.1</td>
<td>20</td>
<td>2</td>
<td>2.1</td>
<td>22</td>
<td>12.4%</td>
<td>-0.81 [-1.44, -0.18]</td>
<td></td>
</tr>
<tr>
<td>Williams et al., 2009</td>
<td>27.7</td>
<td>22.56</td>
<td>43</td>
<td>38.5</td>
<td>18.3</td>
<td>47</td>
<td>20.8%</td>
<td>-0.52 [-0.94, -0.10]</td>
<td></td>
</tr>
</tbody>
</table>

Total (95% CI) 297 267 100.0% -0.33 [-0.59, -0.07]

Heterogeneity: Chi² = 7.65, df = 4 (P = 0.11); I² = 48%

Test for overall effect: Z = 2.45 (P = 0.01)

## Back-specific disability

<table>
<thead>
<tr>
<th>Study</th>
<th>Yoga Mean</th>
<th>Yoga SD</th>
<th>Yoga Total</th>
<th>Control Mean</th>
<th>Control SD</th>
<th>Control Total</th>
<th>Weight</th>
<th>Std. Mean Difference</th>
<th>Std. Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saper et al., 2009</td>
<td>6.6</td>
<td>2.6</td>
<td>15</td>
<td>8.3</td>
<td>2.9</td>
<td>15</td>
<td>7.0%</td>
<td>-0.60 [-1.33, 0.13]</td>
<td></td>
</tr>
<tr>
<td>Sherman et al., 2011</td>
<td>4.49</td>
<td>4.73</td>
<td>92</td>
<td>5.73</td>
<td>4.66</td>
<td>45</td>
<td>23.9%</td>
<td>-0.26 [-0.62, 0.10]</td>
<td></td>
</tr>
<tr>
<td>Tilbrook et al., 2011&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5.22</td>
<td>5.27</td>
<td>135</td>
<td>6.43</td>
<td>5.23</td>
<td>140</td>
<td>41.4%</td>
<td>-0.23 [-0.47, 0.01]</td>
<td></td>
</tr>
<tr>
<td>Williams et al., 2005</td>
<td>3.9</td>
<td>5.3</td>
<td>20</td>
<td>12.7</td>
<td>11.4</td>
<td>22</td>
<td>8.9%</td>
<td>-0.96 [-1.60, -0.31]</td>
<td></td>
</tr>
<tr>
<td>Williams et al., 2009</td>
<td>19.3</td>
<td>12.72</td>
<td>43</td>
<td>23.5</td>
<td>12.34</td>
<td>47</td>
<td>18.8%</td>
<td>-0.33 [-0.75, 0.08]</td>
<td></td>
</tr>
</tbody>
</table>

Total (95% CI) 305 269 100.0% -0.35 [-0.55, -0.15]

Heterogeneity: Chi² = 4.98, df = 4 (P = 0.29); I² = 20%

Test for overall effect: Z = 3.39 (P = 0.0007)
Value in Functional Independence

- Functional disability is common in older adults (up to 30%), associated with a high risk of subsequent health decline.
- Elders who maintain their ADL’s have a higher level of independence.
- Declines in these functions are predictive of poor outcomes and illness.
Falls in the Elderly

- A common Geriatric syndrome
- Annually, 40% of elderly people living in the community fall; 50% of nursing home residents fall
- Leading cause of injury and deaths in the older adult
- Leading cause of hospital admissions for trauma in this age group
- A multifactorial problem and public health issue
- Interventions
  - Reducing Polypharmacy
  - Osteoporosis related fragility fractures
  - Frailty and sarcopenia
  - Gait and balance
Incidence of falls in the Chinese Elderly

- Retrospective cross sectional study in 2005
- 18% falls per year
- Lower in comparison with US, UK and European studies
- Etiology:
  - 10% related to syncope
  - In non syncopal falls- related to acute medical illness (pneumonia, dehydration, anemia
  - Remainder: multifactorial

Tai-Chi
In reducing falls in the Elderly

Original Article

Effect of Tai Chi Exercise on Fall Prevention in Older Adults: Systematic Review and Meta-analysis of Randomized Controlled Trials

Yu-Ning Hu ¹, Yu-Ju Chung ², Hui-Kung Yu ², Yu-Chi Chen ³, Chien-Tsung Tsai ⁴, Gwo-Chi Hu ²*

¹ Institute of Economics and Social Studies, National United University, Miaoli, ² Department of Rehabilitation Medicine, Mackay Memorial Hospital, ³ Department of Nursing, School of Nursing, National Yang-Ming University, Taipei, ⁴ Department of Rehabilitation Medicine, Da Chien General Hospital, Miaoli, Taiwan

Meta-analysis of all studies published up to 2013
Quality assessed using the Physiotherapy Evidence Database scale

10 Trials involving 2850 Participants

Compared to control group, Tai Chi exercise showed a significant reduced risk of falls. (Odds ratio 0.70 CI 0.59-0.84).
Subgroup analysis found no evidence of differential effects by training duration or Tai Chi style
“I don’t mean to appear unenlightened, Mr. Grove, but I don’t think this is the time to explore alternative forms of treatment.”