Scientific Research on Yoga: A Global View from the Cutting Edge

December 18, 2012

Winter Solstice Sadhana

Sat Bir S. Khalsa, Ph.D.

Director of Research
Kundalini Research Institute

Assistant Professor of Medicine
Harvard Medical School
Prevalence of Yoga Practice
Popularity of Yoga Practice
Yoga Practice in the United States
Yoga Room Etiquette

This room is exclusively for yoga practice, please observe the following:

- Remove shoes upon entering
- Dispose of food and drinks
- Silence is appreciated
- Turn off all mobile devices
- Keep the doorway clear
This morning was brought to you by a good night’s sleep.

For great mornings, take comfort in our strength.
“Thanks for getting active with me!
I hope you’re enjoying your McDonald’s®
Yourself! Fitness® Workout DVDs.”

Check out this website for great ways
to make the most of your workouts.

Click on a DVD to get more information about each workout.

Try the New Asian Salad —
a new way to cool down after exercise.

ACHIEVE BALANCE.

The Go Active!™ Happy Meal® for adults features MAYA, your own virtual fitness trainer
who gives you a customized workout on 1 of 4 Yourself! Fitness® DVDs
when you order any Premium Salad and drink.
Why Yoga?
“Yoga teaches you the techniques and awareness to stay healthy. You gain strong immune, glandular and nervous systems. This foundation gives you energy and lets you deal with the mental and spiritual facets of your life.”

Yogi Bhajan
Temporal Changes in Yoga Practice

- Arousal reduction, physical/mental well-being
- Mind/body awareness, self-regulation, resilience
- Psychological / philosophical transformation
Reasons for Practice in a Beginners Program

- General Wellness: 80%
- Physical Exercise: 80%
- Stress Management: 75%
- Seeking a Spiritual Experience: 50%
- Alleviate a Health Condition: 40%
- Friend/Family Recommendation: 30%
- Illness Prevention: 25%
- Other: 20%
- Seeking a Hobby: 15%
- Social Interaction: 10%
- Doctor Recommendation: 5%

I do yoga in my suite. Doctor’s orders. It’s a good conversation starter at breakfast. Almost as good as the complimentary waffles.
Prevalence of Yoga as Therapy
How Your Mind Can Heal Your Body

- New ways to beat THE BLUES
- The link between MENTAL and PHYSICAL HEALTH
- Is HAPPINESS in your genes?
- Women, men and DEPRESSION
Deep Breathing
Meditation
Yoga
Progressive Relaxation

10 Most Common CAM Therapies Among Adults - 2007

Over 35 experts in the field appearing at SYTAR 2009 include:
Swami Veda Bharat
Loren Fishman
Lilias Folan
Kim Innes
Leslie Kaminoff
Sat Bir Khalsa
Shanti Khalsa
Gary Kraftsow
Timothy McCall
Richard Miller
Dean Omish
Larry Payne
Shirley Telles
Rama Vernon

REGISTER AT EARLY BIRD RATES UNTIL DEC 1

The IAYT SYTAR Annual Meeting is the premiere Yoga therapy educational forum

- Learn from experts in the field
- Hear about front line research and exceptional practices
- Share your Yoga therapy experience with your peers

The field of Yoga therapy is growing rapidly and there is no better time to connect with emerging issues and current research.

The focal point of the SYTAR program is learning through lectures, case study presentations and practice sessions delivered by over 35 leading teachers, health professionals and researchers.
This historic meeting is just the second comprehensive and widely publicized academic research meeting in the West devoted to Yoga therapy research.

- Yoga research oral and poster presentations by leading scientists
- Opportunities to interact and dialogue with active yoga researchers
- A comprehensive preconference workshop on the basics of yoga research

SYR is a single track academic research meeting that will include keynote speakers, Luciano Bernardi, BN Gangadhar and Lonnie Zeltzer, invited oral presentations from other senior researchers, multiple poster sessions and ample opportunities to interact with other scientists, experts and professionals in the field.

Yoga Research 101, a preconference workshop on the basics of yoga research offers a unique opportunity for research trainees, yoga instructors, and therapists to learn the basics of Yoga research, establish connections for possible future research projects and meet professional researchers and colleagues.

The Kripalu Center for Yoga & Health is a non-profit educational organization dedicated to promoting the art and science of Yoga to produce thriving health in individuals and society. For more than 30 years, Kripalu Center has been teaching skills for optimal living through experiential education for the whole person—body, mind, and spirit. While you are at Kripalu, you'll enjoy daily Yoga...
Yoga Research in Perspective
Why Not Do Research on Yoga?

- Costly
  - $2 million full study
  - $700 K preliminary study

- Lengthy
  - full study 5 years, preliminary study 3 years
  - requires replication and critical mass

- Reductionist / Dualistic / Dehumanizing
Why Do Research on Yoga?

- Because a significant fraction of the population is using it as a therapy
- To promote its use by the general public
- To reach populations that ordinarily do not have access to and/or knowledge of yoga
Penetrating the Population

Two systems are in place in society that penetrate to all levels of the population

- The education system
- The healthcare system

Both systems require validation of techniques and procedures before implementation
Penetrating the Population

Dental Hygiene in Education and Healthcare
- Fully accepted in principle by these systems
- Taught & promoted in these systems
- Widespread adoption in society as a cultural norm

Mind-Body Hygiene (Yoga)
- NOT accepted in principle by these systems
- NOT taught and promoted in these systems
- Growing but narrow adoption in society as a cultural norm
Review of Basic Yoga Research Historically
Yoga Mimamsa

- Swami Kuvalayananda and colleagues at Kaivalyadhama Laboratory, Lonavla starting in 1924.

- 56 papers by Kuvalayananda from 1924-34 and 1954-73
Brosse, 1936

From: *Documents recueillis aux Indes sur les “Yoguis” par l’enregistrement simultane du pouls, de la respiration et de l’electrocardiogramme* [Data gathered in India on a Yogi with simultaneous registration of the pulse, respiration, and electrocardiogram]
Laubry C, Brosse T
La Presse Medicale 44:1601-1604, 1936.
“…physiologically Yogic meditation represents deep relaxation of the autonomic nervous system without drowsiness or sleep …”

Physiology of Meditation

Green & Green, 1977

### Stress Reduction with Yoga

**Perceived Stress Scale**

<table>
<thead>
<tr>
<th></th>
<th>Pre-treatment</th>
<th>Post-treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>1.4</td>
<td>1.6</td>
</tr>
</tbody>
</table>

**Stress Behavior Scale**

<table>
<thead>
<tr>
<th></th>
<th>Pre-treatment</th>
<th>Post-treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>1.6</td>
<td>1.8</td>
</tr>
</tbody>
</table>

**Urinary Noradrenaline**

<table>
<thead>
<tr>
<th></th>
<th>Pre-treatment</th>
<th>Post-treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>200</td>
<td>250</td>
</tr>
</tbody>
</table>

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Stress in Beginner Yoga Students

Long-term Meditation & Cortical Thickness


...participation in MBSR is associated with changes in gray matter concentration in brain regions involved in learning and memory processes, emotion regulation, self-referential processing, and perspective taking.

Yoga, Thalamic GABA, Mood & Anxiety

FIG. 2. Spectral data showing an increase in the area of the edited γ-aminobutyric acid (GABA) resonance doublet at 3.00 parts per million (ppm) from scan 2 to scan 3 for the left thalamic voxel in the yoga group. Glx, glutamate and glutamine complex; MRS, magnetic resonance spectroscopy; NAA, N-acetylaspartate; MM, macromolecules.

## Changes in GABA, ANS, HPA Axis

### Stress Related Imbalance Corrected by Yoga-Based Practices

<table>
<thead>
<tr>
<th>Stress</th>
<th>Yoga-Based Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>↑ Sympathetic Nervous System (SNS)</td>
<td>↑ Parasympathetic Nervous System</td>
</tr>
<tr>
<td>↑ Hypothalamic-pituitary-adrenal Axis</td>
<td>↓ Hypothalamic-pituitary-adrenal Axis</td>
</tr>
<tr>
<td>↓ GABA Activity</td>
<td>↑ GABA Activity</td>
</tr>
</tbody>
</table>

Meditation and the DMN

Genomic Counter-Stress Changes Induced by the Relaxation Response

Jeffery A. Dusek\textsuperscript{1,2,3,6,9}, Hasan H. Otu\textsuperscript{3,4,9}, Ann L. Wohlhueter\textsuperscript{1}, Manoj Bhasin\textsuperscript{3,4}, Luiz F. Zerbin\textsuperscript{3,4}, Marie G. Joseph\textsuperscript{4}, Herbert Benson\textsuperscript{1,3,5,9}, Towia A. Libermann\textsuperscript{3,4,9}

Abstract

\textit{Background:} Mind-body practices that elicit the relaxation response (RR) have been used worldwide for millennia to prevent and treat disease. The RR is characterized by decreased oxygen consumption, increased exhaled nitric oxide, and reduced psychological distress. It is believed to be the counterpart of the stress response that exhibits a distinct pattern of physiology and transcriptional profile. We hypothesized that RR elicitation results in characteristic gene expression changes that can be used to measure physiological responses elicited by the RR in an unbiased fashion.

\textit{Methods/Principal Findings:} We assessed whole blood transcriptional profiles in 19 healthy, long-term practitioners of daily RR practice (group M), 19 healthy controls (group N\textsubscript{1}), and 20 N\textsubscript{1} individuals who completed 8 weeks of RR training (group N\textsubscript{2}). 2209 genes were differentially expressed in group M relative to group N\textsubscript{1} (p<0.05) and 1561 genes in group N\textsubscript{2} compared to group N\textsubscript{1} (p<0.05). Importantly, 433 (p<10\textsuperscript{-10}) of 2209 and 1561 differentially expressed genes were shared among long-term (M) and short-term practitioners (N\textsubscript{2}). Gene ontology and gene set enrichment analyses revealed significant alterations in cellular metabolism, oxidative phosphorylation, generation of reactive oxygen species and response to oxidative stress in long-term and short-term practitioners of daily RR practice that may counteract cellular damage related to chronic psychological stress. A significant number of genes and pathways were confirmed in an independent validation set containing 5 N\textsubscript{1} controls, 5 N\textsubscript{2} short-term and 6 M long-term practitioners.

\textit{Conclusions/Significance:} This study provides the first compelling evidence that the RR elicits specific gene expression changes in short-term and long-term practitioners. Our results suggest consistent and constitutive changes in gene expression resulting from RR may relate to long term physiological effects. Our study may stimulate new investigations into applying transcriptional profiling for accurately measuring RR and stress related responses in multiple disease settings.
Mechanisms in Yoga Practice

- Control of attentional networks
- Reduction of Default Mode Network activity
- Reduction of rumination and dysfunctional thoughts
- Induction of the psychophysiological “relaxation response”
- Structural brain changes in cortex and limbic system
- Mind-body effects, e.g. self-efficacy, belief, expectation
- Induction of contemplative states and self-identity changes
- Vagal afferent activity from pranayama and asanas
- Physical fitness, e.g. flexibility, endurance, respiratory
- Direct organ/tissue effects
- Subtle energy mechanisms, e.g. prana, qi
Review of Applied Yoga Research
A Review of Yoga Therapy Research


SPECIAL INVITED ARTICLE

YOGA AS A THERAPEUTIC INTERVENTION: A BIBLIOMETRIC ANALYSIS OF PUBLISHED RESEARCH STUDIES

SAT BIR S. KHALSA

Division of Sleep Medicine,
Department of Medicine,
Brigham and Women’s Hospital,
Harvard Medical School

(Received on May 8, 2004)

Publication Source – Non-Yoga Journals

- Publications to 2003
- Publications to 2008

India: 60%
US: 20%
England: 10%
Europe: 5%
Australia: 5%
Other: 0%
Chronology of Yoga Therapy Research
Hypertension

Asthma

Diabetes

Back Pain

Future Directions

- New Disorders
- Neuroimaging
- Genomic Expression
- Specificity of Practices
- Cost-effectiveness
- Prevention
- Positive Psychology
Yoga Research by Institutes
Swami Vivekananda Yoga Anusandhana Samsthana or S-VYASA is a Yoga University declared deemed-to-be University under Section 3 of the UGC Act, 1956 vide Notification Number F.9-45/2001-U.3 dated 8/5/2001 of the Government of India.

Yoga Research and Yoga Therapy – two Yoga fields which S-VYASA has poured life into.

Over the years, S-VYASA has been substantiating scientific validation through Research @ S-VYASA. We have successfully published more than 150 papers which have all been indexed in Medline and/or Psychlit/Psychinfo. S-VYASA has carried itself as a Centre of Advanced Research (CAR) in Yoga and Neurophysiology accredited by the Indian Council of Medical Research (ICMR).

S-VYASA also houses one-of-its-kind Yoga Therapy Home with a 250-bed inpatient treatment facility called Arogyadhama. This is a Yoga Research Health Home which has been envisioned for prevention and treatment of Diseases, long-term rehabilitation and for Promotion of Positive Health.
PG Diploma in Yoga Education

POST GRADUATE DIPLOMA IN YOGA EDUCATION (D.Y.E.D) COURSE DETAILS:

Duration: The course begins from the 16th of July every year.
Minimum Qualification required: 45% in Graduation of any faculty recognized by UGC. Age criteria are not applicable for this course. Medical Fitness of the candidates while admission should be compulsory. Last date of receiving application is 31st May....

“Yoga, Naturopathy, Ayurveda .... Yoga Education & Research.
Kaivalyadhama is set in 180 acres of verdant parkland in Lonavala, near Mumbai.”
Aims & Objectives Of Patanjali Research Foundation

AIMS & OBJECTIVES OF PATANJALI RESEARCH FOUNDATION

1. To undertake Research in the areas of
   i. Bio-medical studies.
   ii. Revitalizing &restore ancient system of knowledge and synchronization between traditional and modern system of medicine.
   iii. Traditional Agricultural activities.
   iv. Development of new products, processes which are eco friendly and not enhancing global warming and environmental hazards.
   v. Indian System of Medicine.
   vi. New Techniques Adoption with Bio-Technological application in agro sector, for protecting the endangered medicinal plants at high altitude.
The Preventive Medicine Research Institute

a non-profit public foundation, our primary mission is to perform pioneering scientific research, education, and service of the highest quality.

- Prior & Ongoing Research
- Medicare Lifestyle Modification Program Demonstration
- Medical Journal References and Abstracts
- Related Press
- Professional Staff
- Dean Ornish, MD’s Upcoming Speaking Engagements
- Donating & Volunteering

Lifestyle Advantage
From Highmark and Dean Ornish, MD
Enroll through hospitals and health plans across the country
Enroll in a New Hope, New Choices Retreat

WebMD
Get Started With An Assortment of Online Program Resources:
Support and Connect with others online:
Dean Ornish, MD's Lifestyle channel at WebMD

Virtual Gourmet Cooking Demonstrations
150 Open Your Heart Recipes
Guided Meditations
Yoga Tutorials and more...

The Preventive Medicine Research Institute, 900 Bridgeway, Sausalito, CA 94965
Phone 415.332.2525 / Fax 415.332.5730
Art of Living Foundation

"Dedicated to Making Life a Celebration"

Art of Living Foundation is dedicated to serving society by strengthening the individual. We do this by offering programs that eliminate stress, create a sense of belonging, restore human values, and encourage people from all backgrounds, religions, and cultural traditions to come together in celebration and service.

The Art of Living Course: "The Yoga of Breath"

The Art of Living Course includes the Sudarshan Kriya®, a powerful breathing technique which eliminates stress and brings one completely into the present moment... Read more

Yoga
Art of Living courses include a wealth of ancient Yogic practices...

The Breath
There is a great secret in the breath. You have an in-built ability to calm the mind, heal the body, energize the whole system in minutes.

Meditation
Sahaj Samadhi, or "effortless transcendence" is a profound technique which teaches the art of letting go.

Service
In more than 100 countries around the world, Art of Living volunteers donate their time to projects large and small...

Knowledge
To be in Knowledge is to have a broad vision of life. Wisdom lies in knowing that the whole world belongs to you...

Art of Living Bookstore
Our on-line store is now open for on-line ordering. You can preview many of the audiotapes on-line.

If you are looking for The Art of Living Coalition, it is at www.artliving.com
(Not related to the Art of Living Foundation.)
The Yoga Institute was founded by Shri Yogendraji in 1918. He is known as the father of modern yoga renaissance. The Yoga Institute, Santacruz is a beehive of activities and every person can benefit from its various courses. The Institute is internationally renowned for its pioneering work in educational, scientific and cultural activities. It is a non-profit, non-sectarian organization.

What is Yoga?
Yoga has a wider message for modern men and women. This is neither of a highly materialized technocrat of today nor of a gullible godman of yesterday. It is that of improving the individual member of society to ultimately improve society itself.
Dissertations and projects

AYUSH Projects underway:

The Advanced Centre for Yoga, NIMHANS, would be conducting several research activities from clinical validation to molecular mechanism of yoga in psychiatric and neurological conditions. The centre will also
Research Projects

- Effect of Yoga Therapy on Patients of Type II Diabetes Mellitus With Neuropathy
- Effect of Yoga Therapy on Autonomic Function and Biochemical Profile of Patients of Essential Hypertension

Pilot Research Projects

Various pilot studies have been done by ACYTER staff under the direction of Dr Madanmohan, Programme Director ACYTER. The following studies have been conducted by Shri Jayasettiaselon SRF, Dr Zeena Sanjay SRF, Shri G Dayanidy, Yoga Instructor and Selvi Vithiyalakshmi Yoga Instructor and coordinated by Dr Ananda Balayogi Bhavanani, Programme Co-ordinator.

- Immediate Effect of Sukha Pranayama on Heart Rate and Blood Pressure of Patients With Hypertension
- Immediate Cardiovascular Effects of Kaya Kriya in Normal Healthy Volunteers
- Immediate Effect of Shavasana and Savitri Pranayama on Heart Rate and Blood Pressure of Hypertensive Patients
- Immediate Effect of Chandra Nadi Pranayama on Heart Rate and Blood Pressure of Hypertensive Patients
- Immediate Cardiovascular Effects of Shavasana and Pranava Pranayama on Heart Rate and Blood Pressure of Hypertensive Patients
- Immediate Effects of Yoga Nidra on Heart Rate and Blood Pressure

EFFECT OF YOGA THERAPY ON PATIENTS OF TYPE II DIABETES MELLITUS WITH NEUROPATHY
Kripalu Institute for Extraordinary Living
Changing the World Through Yoga Research

What if we were to make yoga widely available to children in schools? To our military personnel? To those with mental and physical illness? To our elderly?

Yoga has the potential to change our world—both through the alleviation of suffering and the creation of vast opportunities for self-fulfillment. Those of us who practice yoga know that this is true. But in order to bring the transformational effects of yoga deeply into our society, these effects must first be scientifically evaluated—and that’s just what we’re doing at Kripalu’s Institute for Extraordinary Living (IEL).

Did you know that the IEL sponsors the largest and most influential team of yoga researchers in the West? We currently support a team of Harvard Medical School faculty and research assistants who are studying the effects of yoga on a wide spectrum of human functioning—from...
Kripalu Yoga for Performance Anxiety

Music Performance Anxiety Inventory for Adolescents (MPAI-A)

Baseline
End Program
MPAI-A Average Score

Yoga for PTSD

Clinician Administered PTSD Scale

Total CAPS Score

Baseline vs End Treatment

Graph showing a decline in Total CAPS Score from Baseline to End Treatment.
Mental Health Outcomes

Worsening | Improvement

Social Stress
Attitude to School
Anger
Resilience
Negative Affect
Anxiety
Anger Expression
Kundalini Yoga Research
Published Research Involving Kundalini Yoga


Effect of Breathwalk on body composition, metabolic and mood state in chronic hepatitis C patients with insulin resistance syndrome

M Vázquez-Vandyck, S Roman, JL Vázquez, L Huacuja, G Khalsa, R Troyo-Sanromán, A Panduro

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M Vázquez-Vandyck, S Roman, A Panduro, Health Sciences University Center, University of Guadalajara, Guadalajara Jalisco, México
JL Vázquez, Epidemiology Department, Regional General Hospital No.110, Mexican Institute of Social Security and Public Health Department, University of Guadalajara, Guadalajara Jalisco, México
L Huacuja, Chronic Degenerative Diseases Institute, Health Sciences University Center, University of Guadalajara, Guadalajara Jalisco, México
G Khalsa, Kandulini Research Institute, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02215, United States
R Troyo-Sanromán, Research Unit, Health Sciences University

(106 ± 93 U/L vs 59 ± 32 U/L, P < 0.01), total bilirubin (0.09 ± 1 mg/dL vs 0.62 ± 0.2 mg/dL, P < 0.01), ALT/AST ratio (1.04 vs 0.70, P < 0.01), triglycerides (165 ± 86 mg/dL vs 124 ± 49 mg/dL, P < 0.01) and the IR risk (4.0 vs 2.7). Most patients (88%) indicated to feel better at the end of BW (P < 0.01).

CONCLUSION: Breathwalk has an important effect on body composition, lipid profile and liver enzymes. It is also easy, inexpensive and has a beneficial effect on metabolic and mood state in HCV patients.

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Key words: Breathwalk; Chronic hepatitis C; Insulin resistance; Obesity; Quality of life
Welcome to the GRD Center for Medicine & Humanology

The Guru Ram Das Center is the only foundation of its kind in the world. We concentrate on health education and instruction in yoga and meditation, research and professional training to bring the kind of service that brings hope for a return to health for persons with chronic or life-threatening illness and their families. No other organization in the world has more expertise in getting this kind of care to families in need.

The Guru Ram Das Center Mission
Our mission is to provide health education and instruction in yoga and meditation to persons with chronic or life threatening illness and their family members. We train health professionals to use these techniques in their practice and we conduct research into the medical effects of Kundalini Yoga.

Carmelita Daniella Lima Sotantar Kaur Scholarship Fund
This fund is in memory of Carmen Lima, who with her husband Larry, a long time volunteer, wanted to teach Kundalini Yoga to people with illness.

Our programs integrate with medical treatment. We provide out-patient services to people with medical conditions at all stages, including newly diagnosed, treatment phase, recovery, recurrence or end-stage. Currently, our primary service is to people with cancer, chronic fatigue, chronic pain, diabetes, or HIV disease, including anxiety, depression, grief recovery and life transitions.
Yoga as a Treatment for Diabetes
Guru Ram Das Center for Medicine and Humanology

Profile of Mood States (POMS)

Score

Anger
Confusion
Depression
Fatigue
Anxiety
Yoga as a Treatment for Diabetes
Guru Ram Das Center for Medicine and Humanology

Audit of Diabetes Dependent Quality of Life (ADDQol)
Alzheimer's Research

Joint Project with University of Pennsylvania

The study will look at patients with mild cognitive impairment or symptoms of early Alzheimer's disease and will combine meditation with brain imaging over a period of time to see if meditation improves cognitive function and is associated with actual change in the brain's activity levels.

Study participants will learn a particular kind of meditation, called Kirtan Kriya, identified as one of the most fundamental types of meditation practice. (See the previous study described below) It is a repeated chanting of sounds and finger movements designed to help the mind focus and become sharper. Study participants will perform this meditation program every day for eight weeks to see if this technique can change the brain's response to different tasks.

The study will use SPECT (Single Photon Emission Computed Tomography) imaging to capture the baseline image of the brain as well as the brain's activity during meditation. Images will be taken at the beginning of the study and then after the eight-week program.

Click here to read the full University of Pennsylvania press release and see how you can participate.

Kirtan Kriya Research Study: Fact Sheet

The Alzheimer's Prevention Foundation International has assembled this "411" on Kirtan Kriya for medical professionals, the public, caregivers, the media, and spas.
Kirtan Kriya on Brain Function

Kirtan Kriya for Memory Loss

FMRI of Different Meditations

↑ Primarily forebrain areas

↑ Primarily deeper limbic & paralimbic structures

# 2 ↑ in deeper LH limbic & forebrain structures + other differences

Kirtan Kriya on Mental Health and Cognition

Table 2  Comparison of the change scores in clinical outcomes and biological measures in the two treatment groups

<table>
<thead>
<tr>
<th>Change scores</th>
<th>Meditation (N = 23) Mean (SD)</th>
<th>Relaxation (N = 16) Mean (SD)</th>
<th>F (1,36)*</th>
<th>p-value*</th>
<th>Effect size Cohen's d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HAM-D</td>
<td>−7.4 (3.7)</td>
<td>−5.3 (4.5)</td>
<td>2.43</td>
<td>0.06</td>
<td>0.51</td>
</tr>
<tr>
<td>MCS of SF-36</td>
<td>12.8 (9.7)</td>
<td>6.3 (10.6)</td>
<td>3.87</td>
<td>0.03</td>
<td>0.64</td>
</tr>
<tr>
<td>Role emotional scale</td>
<td>33.3 (30.2)</td>
<td>−0.01 (47.2)</td>
<td>7.08</td>
<td>0.005</td>
<td>0.84</td>
</tr>
<tr>
<td>Energy scale</td>
<td>19.6 (20.6)</td>
<td>5.0 (16.7)</td>
<td>5.68</td>
<td>0.01</td>
<td>0.78</td>
</tr>
<tr>
<td>Cognition</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>MMSE</td>
<td>0.2 (0.7)</td>
<td>−0.9 (1.2)</td>
<td>13.79</td>
<td>0.0003</td>
<td>1.12</td>
</tr>
<tr>
<td>Trails A time</td>
<td>−3.6 (10.4)</td>
<td>−1.3 (18.7)</td>
<td>0.32</td>
<td>0.29</td>
<td>0.15</td>
</tr>
<tr>
<td>Trails B time</td>
<td>−11.2 (19.7)</td>
<td>9.9 (30.5)</td>
<td>7.46</td>
<td>0.005</td>
<td>0.82</td>
</tr>
<tr>
<td>CVLT long delay cued recall</td>
<td>−0.6 (2.4)</td>
<td>−0.8 (2.5)</td>
<td>0.10</td>
<td>0.38</td>
<td>0.08</td>
</tr>
<tr>
<td>Biological activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telomerase, units/10,000</td>
<td>0.9 (2.5)</td>
<td>−0.2 (1.2)</td>
<td>2.75</td>
<td>0.05</td>
<td>0.56</td>
</tr>
</tbody>
</table>

Kirtan Kriya on Immune Function

68 genes were found to be differentially expressed (19 up-regulated, 49 down-regulated)

Up-regulated genes included immunoglobulin-related transcripts.

Downregulated transcripts included pro-inflammatory cytokines and activation-related immediate early genes.

In 1973 3HO launched its SuperHealth program and clinic, a drugless addiction treatment program in Tucson, Arizona. 3HO SuperHealth was accredited by the prestigious Joint Commission on Accreditation of Healthcare Organizations and received its highest commendation. The philosophy of 3HO SuperHealth was based upon the belief that natural healing techniques such as Kundalini Yoga, meditation, special diets, hydrotherapy, and massage utilized in a structured environment such as a holistic therapeutic community, are the most effective way of treating people who have problems with addictions.

"Asking for self-reliance and obtaining self-reliance is not only great, it is the answer to every problem of life. No one is so small that they cannot be great."

Yogi Bhajan

3HO’s SuperHealth Program had excellent results helping thousands of individuals to not only free themselves from alcohol or drugs but to begin to lead a life without negative addictions. In 1978 it distinguished itself as being in the top 10% of all treatment programs throughout the United States, with a recovery rate of 91%. In 1989, Yogi Bhajan met with President Mikhail Gorbachev, and established several addiction treatment programs in Russia based on the 3HO SuperHealth model.
Yoga for Addictions
Yoga as a Treatment for Insomnia

- Randomized Trial of Shabad Kriya in Insomnia
- Intensive In-Laboratory Randomized Trial of Shabad Kriya
Sleep Diary Data

Sleep Onset Latency

- Baseline
- Wk 1-2
- Wk 3-4
- Wk 5-6
- Wk 7-8
- Followup

Average Sleep Onset Latency (minutes)

- Baseline: 20
- Wk 1-2: 30
- Wk 3-4: 40
- Wk 5-6: 50
- Wk 7-8: 60
- Followup: 70

Sleep Efficiency

- Baseline
- Wk 1-2
- Wk 3-4
- Wk 5-6
- Wk 7-8
- Followup

Average Sleep Efficiency (%)

- Baseline: 70
- Wk 1-2: 75
- Wk 3-4: 80
- Wk 5-6: 85
- Wk 7-8: 90
- Followup: 95

Total Wake Time

- Baseline
- Wk 1-2
- Wk 3-4
- Wk 5-6
- Wk 7-8
- Followup

Average Total Wake Time (hr)

- Baseline: 0.8
- Wk 1-2: 1.0
- Wk 3-4: 1.2
- Wk 5-6: 1.4
- Wk 7-8: 1.6
- Followup: 1.8

Total Sleep Time

- Baseline
- Wk 1-2
- Wk 3-4
- Wk 5-6
- Wk 7-8
- Followup

Average Total Sleep Time (hr)

- Baseline: 5.5
- Wk 1-2: 6.0
- Wk 3-4: 6.5
- Wk 5-6: 7.0
- Wk 7-8: 7.5
- Followup: 8.0
Sleep Questionnaire Data

Pre-Sleep Arousal Scale

Sleep Efficacy Scale
Yoga for Youth in a Charter School

From: Khalsa, SAK, Khalsa SBS, unpublished data.

Baseline End Program
Average PSS Score
10
12
14
16
18
20
Perceived Stress Scale
Baseline End Program
Average RS Score
100
110
120
130
140
150
Resilience Scale
Baseline End Program
Average PANAS-C PA Score
46
48
50
52
54
56
Positive Affect
Baseline End Program
Average PANAS-C NA Score
20
22
24
26
28
30
32
34
Negative Affect
p = 0.17
p = 0.02
p = 0.07
p = 0.89
KY for Generalized Anxiety Disorder

From: Khalsa, MK, Khalsa SBS, unpublished data.
KY for Generalized Anxiety Disorder

From: Graybiel SSK, Khalsa, SBS, unpublished data.
Research Funding
Research Funding
Research

Research Results
NCCAM conducts research on a wide variety of CAM approaches.

- Potential Roles of the Placebo Effect in Health Care (May 2011)
- Cancer Survivors More Likely Than General Population To Use CAM (Mar 2011)

- Find Research Results by Topic
- Find Research Results by Date

Clinical Trials
These carefully conducted studies are the fastest and safest way to find out if CAM treatments or therapies work in people.

Research Sponsored by NCCAM
The Division of Extramural Research develops and oversees NCCAM-funded research and research training programs.

- Early Stage and New Investigators
- Grants and Funding
- Research Centers

Research Conducted at NCCAM
The Division of Intramural Research conducts clinical, translational, and basic research in Bethesda, MD.

Policies and Guidelines
Documentation from NCCAM and NIH on proper research procedures.

Awarded Grants and Contracts
Lists of research and training grants funded for both new and ongoing research, with links to abstracts.

- NCCAM and the Recovery Act

Related Resources
- CAM on PubMed®
- NCCAM-funded studies in PubMed
- NIH RePORTER—Fedrally funded biomedical research projects
- RCDC Process
- Cochrane Collaboration Complementary Medicine Reviews
The Kundalini Research Institute’s Science and Research

THE RATIONALE FOR YOGA RESEARCH

By Sat Bir Singh Khalsa, KRI Director of Research

Although some research exists for Yoga, and Yoga is to some small extent being applied in a few institutional settings, much more research is needed to facilitate its full incorporation.

As the recently appointed Director of Research for the Kundalini Research Institute (KRI), my role is to coordinate scientific research in Kundalini Yoga and to serve as a resource for Kundalini Yoga researchers and instructors. Some of the plans for the research component of KRI are to provide access to a database of scientific research citations, to develop and facilitate communication and collaboration between those interested in researching Kundalini Yoga, to promote and inspire new research and documentation of the benefits of Kundalini Yoga, and to provide support for Yoga instructors to bring Kundalini Yoga programs to institutional settings and special populations.

Historically, Yoga practice has been restricted to narrow segments of the population, and has not achieved wide acceptance within the medical, educational, and corporate communities as having potential preventive and therapeutic health benefits. The extension of Yoga to these institutions would dramatically broaden its influence, and expand its potential to transform society.

With widespread practice across many populations, Yoga could have a deep positive impact on the physical and psychological health of society as a whole. Despite Yoga’s current popularity and the many personal benefits experienced by those who practice it, such “ anecdotal” evidence is insufficient to facilitate the full incorporation of Yoga into the healthcare and educational systems.

As with any new practice or treatment being considered by the medical community, carefully designed and executed research studies that convincingly and scientifically demonstrate the effectiveness of Yoga will be required before it can be broadly applied to a large number of populations (children, the elderly, diagnosed medical and psychiatric disorders, etc.) and institutions (hospitals, schools, offices, etc.).

Although some research exists for Yoga, and Yoga is to some small extent being applied in a few institutional settings, much more research is needed to facilitate its full incorporation.