



Introduction

October 16, 2017

Yoga Research 101:

The Basics of Yoga Research

for Therapists, Instructors, and New Investigators

IAYT Symposium on Yoga Research

Sat Bir S. Khalsa, Ph.D.

Assistant Professor of Medicine, Harvard Medical School

Director of Research, Kundalini Research Institute

Research Director, Kripalu Center for Yoga and Health

Editor in Chief, International Journal of Yoga Therapy

Research Associate, Benson Henry Institute for Mind Body Medicine

Faculty



Sat Bir Khalsa, PhD

Assistant Professor of Medicine, Brigham and Women's Hospital, Harvard Medical School,



Karen Mustian, PhD

Associate Professor, Department of Surgery, University of Rochester Medical Center



Kim Innes, PhD

Associate Professor, , Department of Epidemiology, West Virginia University



Catherine Cook-Cottone, PhD

Associate Professor, SUNY at Buffalo



Lisa Conboy, MA, MS, ScD

Instructor in Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, The New England School of Acupuncture at MCPHS University

	<i>Pre-conference Workshop</i> Yoga Research 101: The Basics of Yoga Research for Therapists, Instructors, and New Investigators	
Time	Presenter	Presentation Title
1:00 - 1:20 pm	Sat Bir Khalsa, PhD	Introduction and the State of the Field of Yoga Therapy Research
1:20 - 1:30 pm	Full Panel	Q & A
1:30 - 1:50 pm	Karen Mustian, PhD	How to get your first grant: Lessons Learned and Tips
1:50 - 2:10 pm	Full Panel	Q & A
2:10 - 2:30 pm	Kim Innes, PhD	Recruitment, retention, and adherence in clinical trials of yoga: Tips and challenges
2:30 - 2:50 pm	Full Panel	Q & A
2:50 - 3:10 pm	<i>Break</i>	
3:10 - 3:30 pm	Catherine Cook-Cottone, PhD	Considering mechanisms of change in yoga research
3:30 - 3:50 pm	Full Panel	Q & A
3:50 - 4:10 pm	Lisa Conboy, MA, MS, ScD	Tips for adding qualitative data collection to yoga research
4:10 - 4:30 pm	Full Panel	Q & A



Brigham & Women's Hospital

Harvard Medical School



The State of the Field of Yoga Therapy Research

October 16, 2017

Yoga Research 101:

The Basics of Yoga Research

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IAYT Symposium on Yoga Research

Sat Bir S. Khalsa, Ph.D.

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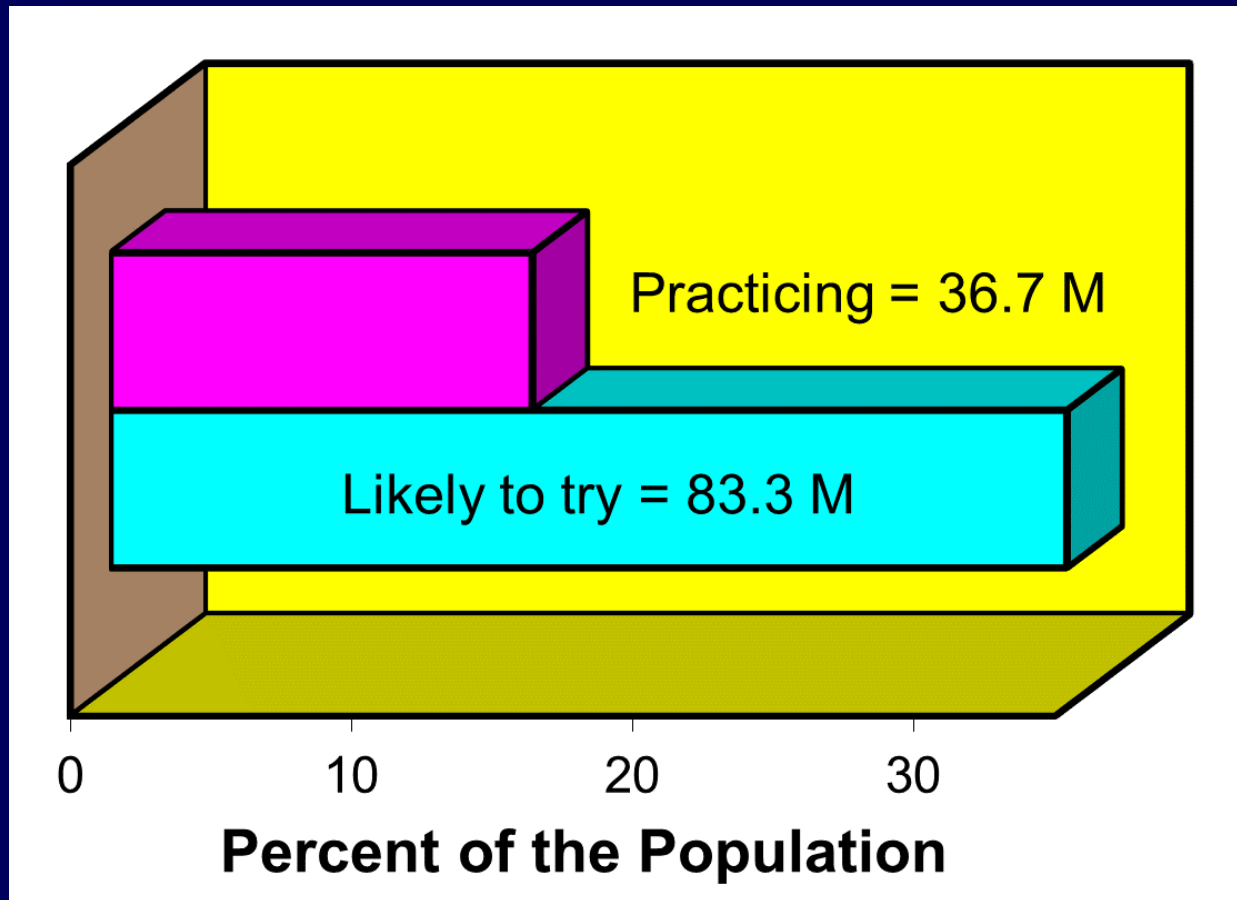
Director of Research, Kundalini Research Institute

Research Director, Kripalu Center for Yoga and Health

Editor in Chief, International Journal of Yoga Therapy

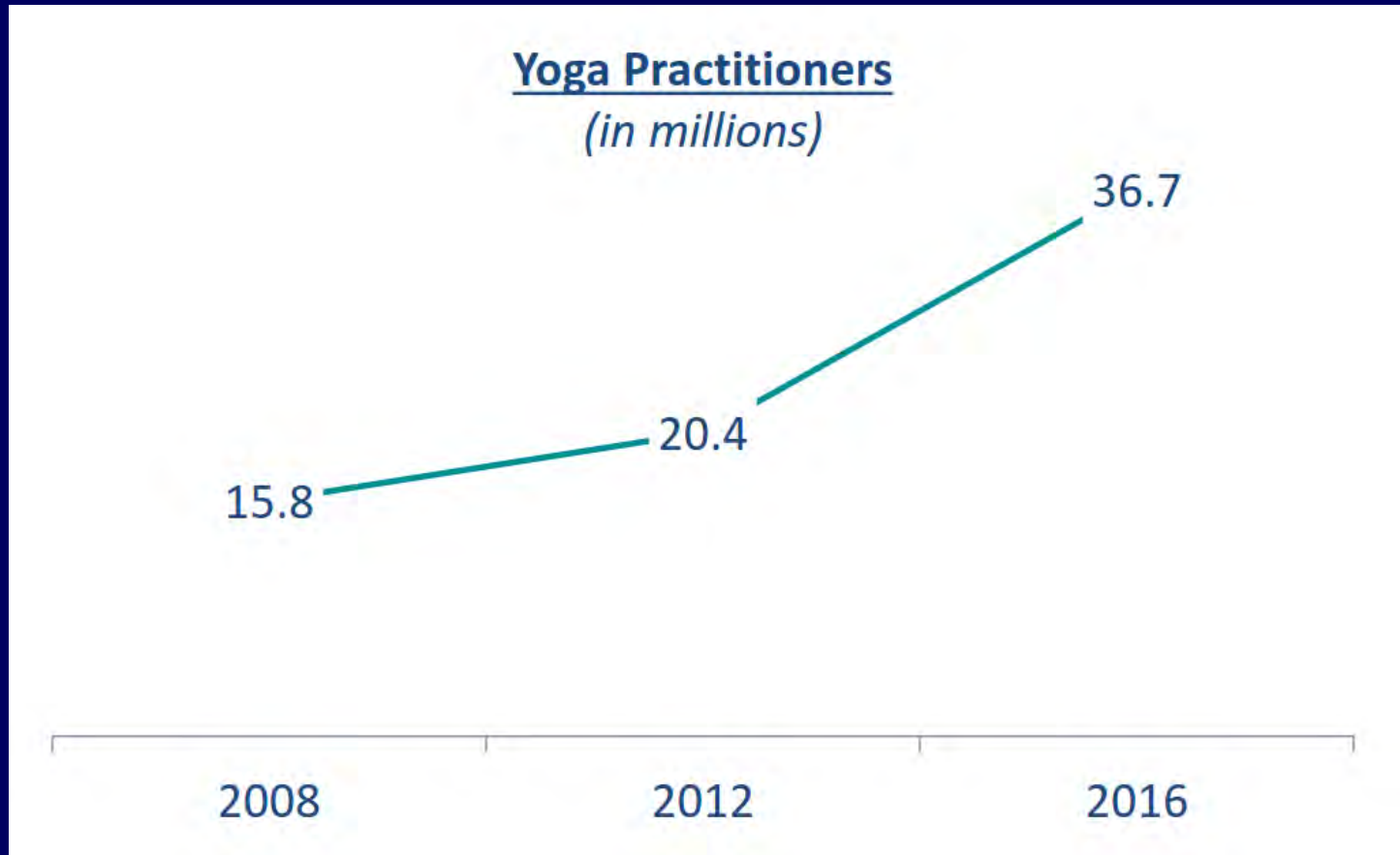
Research Associate, Benson Henry Institute for Mind Body Medicine

Yoga Alliance/Yoga Journal Survey 2016



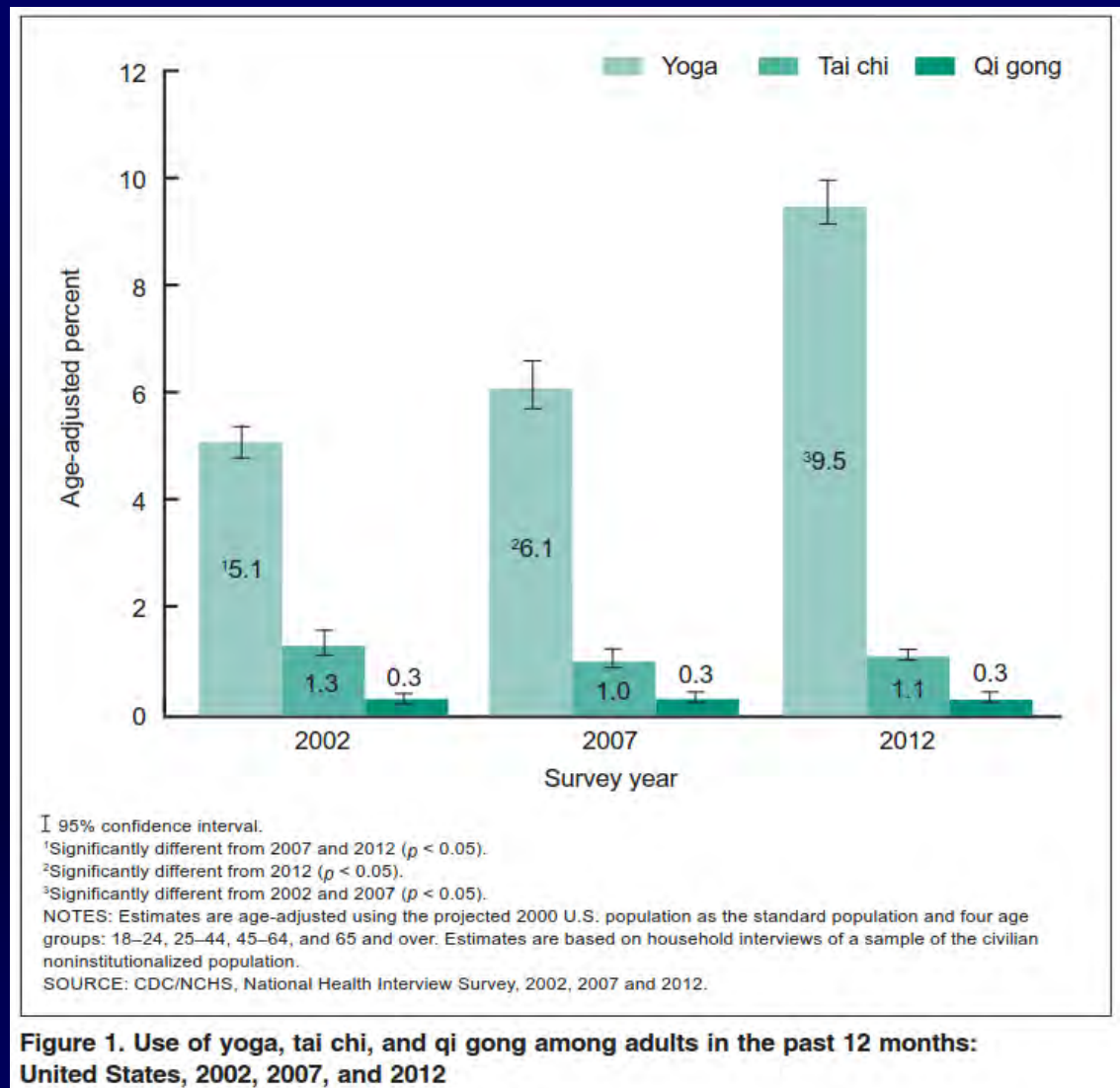
From: <http://www.yogajournal.com/yogainamericastudy/>

Yoga Alliance/Yoga Journal Survey 2016



From: <http://www.yogajournal.com/yogainamericastudy/>

Yoga Practice U.S. Adult Population



From: *Trends in the use of complementary health approaches among adults: United States, 2002-2012*, Clarke TC, Black LI, Stussman BJ, Barnes PM, Nahin RL, *National Health Statistics Report*, 79:1-16, 2015.

How does yoga reduce stress? A systematic review of mechanisms of change and guide to future inquiry

Kristen E. Riley* and Crystal L. Park

 **frontiers**
in Human Neuroscience

HYPOTHESIS AND THEORY
published: 08 May 2015
doi: 10.3389/fnhum.2015.00235

Neurophysiological and neurocognitive mechanisms underlying the effects of yoga-based practices: towards a comprehensive theoretical framework

Laura Schmalzl^{1,2*}, Chivon Powers³ and Eva Henje Blom^{4,5}

¹ Department of Family Medicine and Public Health, School of Medicine, University of California San Diego, La Jolla, CA, USA, ² VA San Diego Healthcare System, La Jolla, CA, USA, ³ Center for Mind and Brain, University of California Davis, Davis, CA, USA, ⁴ Department of Clinical Neuroscience, Karolinska Institute, Stockholm, Sweden, ⁵ Department of Psychiatry, University of California San Francisco, San Francisco, CA, USA

frontiers in
HUMAN NEUROSCIENCE

HYPOTHESIS AND THEORY ARTICLE
published: 30 September 2014
doi: 10.3389/fnhum.2014.00770



Potential self-regulatory mechanisms of yoga for psychological health

Tim Gard^{1,2,3†}, Jessica J. Noggle^{4†}, Crystal L. Park^{5†}, David R. Vago^{6*†} and Angela Wilson^{7†}

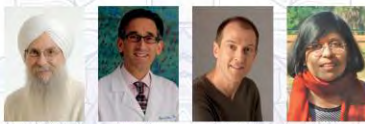
THE PRINCIPLES AND PRACTICE OF YOGA IN HEALTH CARE



Sat Bir Khalsa • Lorenzo Cohen
Timothy McCall • Shirley Telles



THE PRINCIPLES AND PRACTICE OF YOGA IN HEALTH CARE



The *Principles and Practice of Yoga in Health Care* is a professional-level textbook with contributions by multiple expert researchers and therapists in the field.

- This book:
- brings together the science and the practice of yoga therapy
 - supports the emergence of yoga therapy as a credible profession
 - comprehensively summarizes research findings and their practical implications for professionals who use yoga to refer patients for yoga practice
 - includes chapter contributions by leading biomedical researchers of yoga
 - reviews the scientific evidence base for yoga for a wide variety of medical conditions
 - Provides brief contributions by expert yoga therapists describing practical implementation issues relevant to yoga for specific conditions

The editors include three eminent yoga therapy researchers and one renowned practitioner in the field. They have brought together an experienced team of researchers and yoga therapist contributors.

This book will prove essential to yoga therapists, physical therapists, medical doctors, psychologists and other health professionals interested in yoga as a therapeutic intervention.

THE PRINCIPLES AND PRACTICE OF YOGA IN HEALTH CARE
Khalsa et al

CHAPTER FOUR RESEARCH ON THE PSYCHOPHYSIOLOGY OF YOGA

L SCHMALZL • CC STREETER • SBS KHALSA

Introduction

Yoga as a multicomponent practice

Yoga-based practices are inherently multifaceted in nature. In modern contexts, they typically involve a combination of specific postures or movement sequences, breath regulation, deep relaxation, and meditative techniques (Gard et al., 2014b). There are numerous “styles” of yoga-based practices representing various schools and lineages of yoga. Most of them differ in terms of the relative emphasis that is put on each of the main components as well as how these components are taught, which in turn impacts their psychophysiological effects. This chapter will outline what is currently known about the psychophysiology of the main components of yoga-based practices, and how they work in concert, primarily based on basic research studies (i.e., psychophysiology research on healthy populations).

History of basic psychophysiological research on yoga

Basic research on yoga-based practices began in the early twentieth century with the work of Swami Kuvalyananda, founder of the Kaivalyadhama Research Institute and the first yoga research journal, *Yoga Mimamsa*, which was launched in 1924. Kuvalyananda and colleagues conducted dozens of studies on individual yoga practices, which were published in their journal over the next four decades. Many of the early studies focused on investigating the effects of individual physical or respiratory practices with the use of X-rays and measures of air pressure, O_2 and CO_2 levels, acid/base balance, and blood pressure. For Western scientists, interest in the psychophysiology of yoga was likely inspired by the reports of remarkable feats of expert yoga practitioners, such as the ability to slow/stop heart rate and to reduce metabolism sufficiently to survive

in airtight enclosures. These led to observational studies and subsequently published reports in the 1950s and 1960s, which affirmed the ability of these practitioners to self-regulate internal psychophysiological processes including heart rate, respiration, metabolism, and autonomic nervous system functioning (Wenger & Bagchi, 1961).

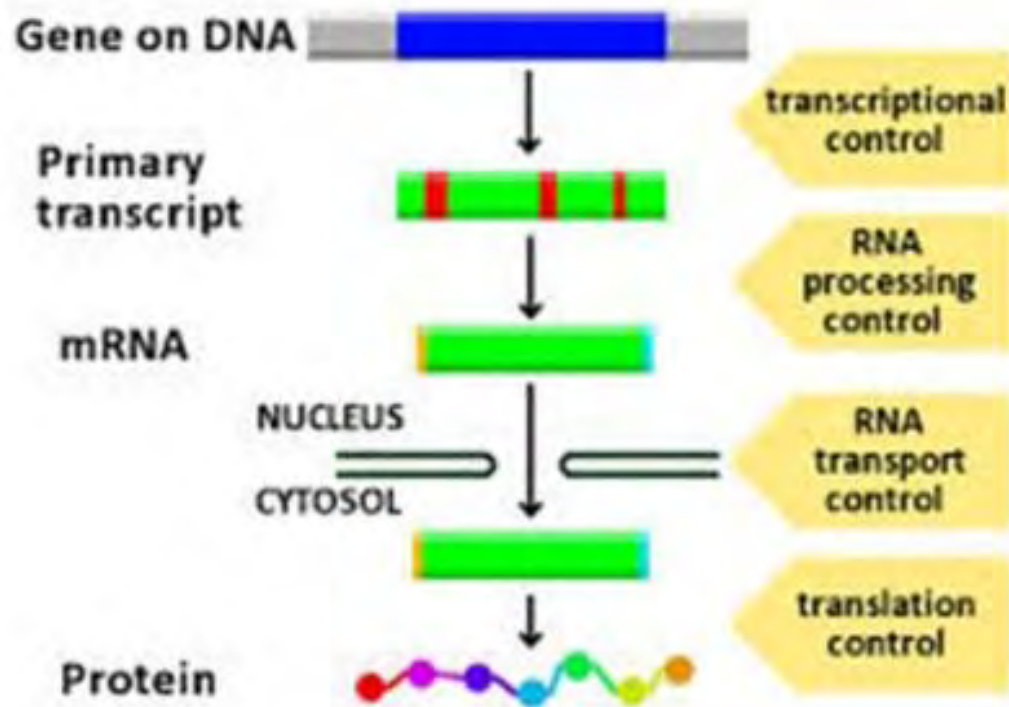
Psychophysiology of yoga postures and movement sequences

Characteristics of yoga postures and movement sequences

Modern yoga-based practices typically have a strong emphasis on postures and movement sequences (Singleton, 2010). In fact, particularly in the West, there are yoga practice styles consisting solely of posture or movement sequences that exist alongside more traditional multicomponent contemplative yoga practice styles. Yoga postures and movements can range from large and overt to small and subtle and may even include purely internal or imagined motion (Schmalzl, Crane-Godreau, & Payne, 2014). Some types of practices involve dynamic and continuous physical movement with a focus on creating a “flow” by linking one posture to the next (Jois, 1999), some are more static with individual postures being held for a longer period of time (Iyengar, 1966), and some employ a combination of flowing movement sequences and static postures.

There are innumerable individual yoga postures and variations thereof, which are typically aimed at increasing range of motion, strength, endurance, flexibility, and balance, as well as promoting relaxation and well-being. In broad terms, yoga postures can be divided into categories including standing postures, seated postures, supine postures, forward bends, backbends, lateral bends of the spine, twists, hip-openers, and inversions. Postures are

Regulation and Gene Expression





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Yogic meditation reverses NF- κ B and IRF-related transcriptome dynamics in leukocytes of family dementia caregivers in a randomized controlled trial

David S. Black^a, Steve W. Cole^{a,b,c}, Michael R. Irwin^{a,b}, Elizabeth Breen^{a,b}, Natalie M. St. Cyr^b, Nora Nazarian^b, Dharma S. Khalsa^d, Helen Lavretsky^{b,*}

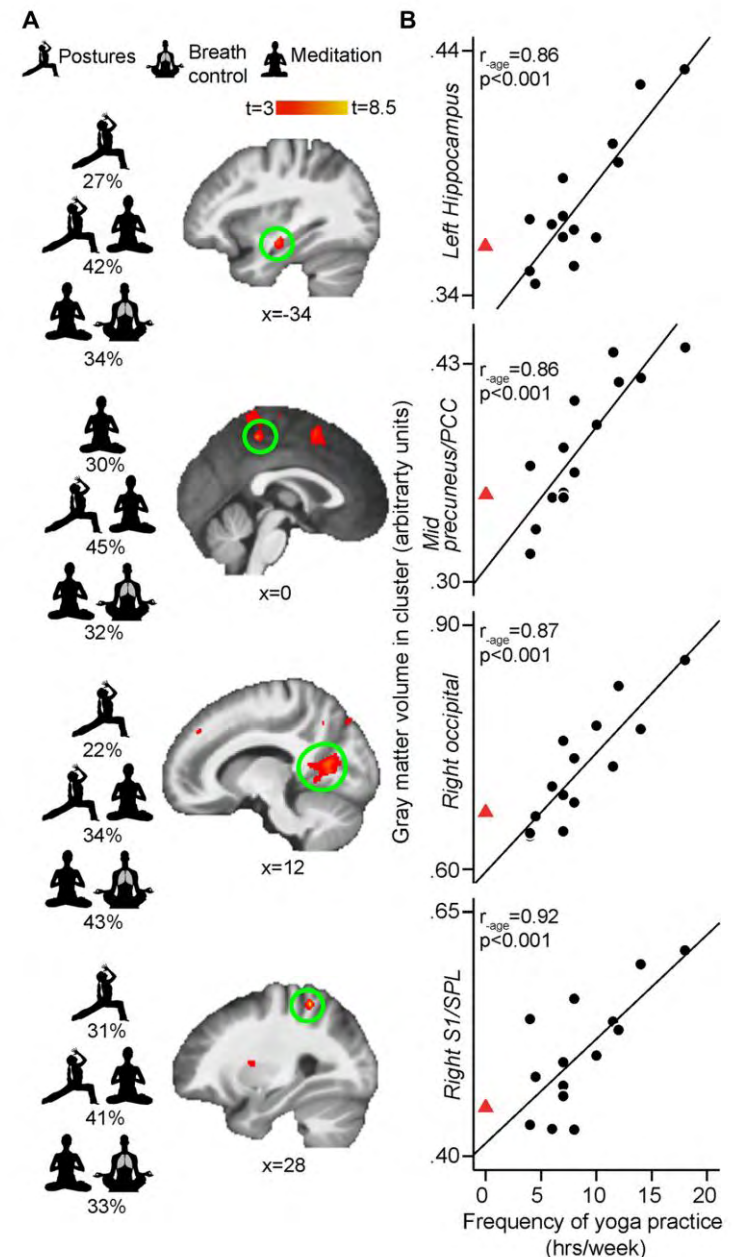
“...the effects of Kirtan Kriya suppressing expression of inflammation-related genes and up-regulating expression of genes involved in antiviral and immunoglobulin responses ...”



Yoga and Brain Structure-Neuroplasticity

...more weekly regular yoga practice is associated with larger brain volume in areas involved in bodily representation, attention, self-relevant processing, visualization, and stress regulation.

From: *Neuroprotective effects of yoga practice: age-, experience-, and frequency-dependent plasticity*, Villemure C, Čeko M, Cotton VA, Bushnell MC, *Frontiers in Human Neuroscience*, May 12;9:281, 2015.



Yoga Practices

Postures, Breathing, Relaxation, Meditation

Fitness

↑Flexibility
↑Strength
↑Coordination/Balance
↑Respiratory Function
↑Self-Efficacy

Self-Regulation

↑Emotion Regulation
↑Stress Regulation
↑Resilience
↑Equanimity
↑Self-Efficacy

Awareness

↑Attention
↑Mindfulness
↑Concentration
↑Cognition
↑Meta-cognition

Spirituality

↑Transcendence
↑Unitive State
↑Flow
↑Transformation
↑Life Meaning/Purpose

Global Human Functionality

↑Physical & Mental Health, ↑Physical, Mental, Emotional Performance,
↑Positive Behavior Change, ↑Social Responsibility, Values, Relationships,
↑Quality of Life, ↑Life Purpose & Meaning, ↑Spirituality

Effects of Yoga on Mental and Physical Health: A Short Summary of Reviews

Hindawi Publishing Corporation
Evidence-Based Complementary and Alternative Medicine
Volume 2012, Article ID 165410, 7 pages
doi:10.1155/2012/165410

**Arndt Büssing,¹ Andreas Michalsen,² Sat Bir S. Khalsa,³
Shirley Telles,⁴ and Karen J. Sherman⁵**

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² *Department of Internal and Complementary Medicine, Immanuel Hospital Berlin and Institute of Social Medicine,
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This report summarizes the current evidence on the effects of yoga interventions on various components of mental and physical health, by focussing on the evidence described in review articles. Collectively, these reviews suggest a number of areas where yoga may well be beneficial, but more research is required for virtually all of them to firmly establish such benefits. The heterogeneity among interventions and conditions studied has hampered the use of meta-analysis as an appropriate tool for summarizing the current literature. Nevertheless, there are some meta-analyses which indicate beneficial effects of yoga interventions, and there are several randomized clinical trials (RCT's) of relatively high quality indicating beneficial effects of yoga for pain-associated disability and mental health. Yoga may well be effective as a supportive adjunct to mitigate some medical conditions, but not yet a proven stand-alone, curative treatment. Larger-scale and more rigorous research with higher methodological quality and adequate control interventions is highly encouraged because yoga may have potential to be implemented as a beneficial supportive/adjunct treatment that is relatively cost-effective, may be practiced at least in part as a self-care behavioral treatment, provides a life-long behavioural skill, enhances self-efficacy and self-confidence and is often associated with additional positive side effects.

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October 16 - 18, 2017

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SYR is the West's foremost academic yoga research conference. SYR showcases some of the best new research and offers multiple poster sessions as well as ample opportunities to interact with other scientists, experts and professionals in the field. SYR 2017 will be held at the Kripalu Center for Yoga & Health in the beautiful Berkshires in western Massachusetts.

THE PRINCIPLES AND PRACTICE OF YOGA IN HEALTH CARE

This is the first book for physicians, yoga researchers, yoga therapists, nurses, and other health care professionals that systematically and comprehensively presents the biomedical research on the efficacy of yoga in health care, describes the implications of this evidence, and provides practical application recommendations.

This book

- brings together the science and the practice of yoga therapy
- reviews the scientific evidence base for yoga for a wide variety of medical conditions
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The editors include three eminent yoga therapy researchers and one renowned practitioner in the field. In addition, they have brought together an experienced team of researchers and 30 yoga therapist contributors.

The Principles and Practice of Yoga in Health Care will prove essential to yoga therapists, physical therapists, physicians, psychologists and other health professionals interested in yoga as a therapeutic intervention.



Sat Bir Singh Khalsa, PhD, is currently an Assistant Professor of Medicine at Brigham and Women's Hospital, Harvard Medical School, Director of Research for the Kundalini Research Institute, Research Director for the Kripalu Center for Yoga & Health, and Research Associate at the Benson-Henry Institute for Mind Body Medicine. He serves with the International Association of Yoga Therapists as scientific coordinator for the annual Symposium on Yoga Research and editor-in-chief of the *International Journal of Yoga Therapy*.



Lorenzo Cohen, PhD, is the Richard E. Haynes Distinguished Professor in Clinical Cancer Prevention, Director of the Integrative Medicine Program, and Chief, Section of Integrative Medicine, Department of Palliative, Rehabilitation, and Integrative Medicine at The University of Texas MD Anderson Cancer Center. He is also Distinguished Clinical Professor, Fudan University Cancer Hospital, Shanghai, China. Dr. Cohen is a founding member and past president of the International Society for Integrative Oncology.



Timothy McCall, MD, is a board-certified internist and the author of two books, *Examining Your Doctor: A Patient's Guide to Avoiding Harmful Medical Care* (Citadel Press) and *Yoga as Medicine: The Yogic Prescription for Health and Healing* (Bantam Books). He teaches yoga therapy seminars and teacher trainings worldwide, co-directs a yoga therapy center, and has been the medical editor of *Yoga Journal* since 2002.



Shirley Telles, MBBS, MPhil, PhD, has been awarded the first ever Indian Council of Medical Research Center for Advanced Research in Bangalore. Since 2007, she has been the Director of the Patanjali Research Foundation in Haridwar, India, which is committed to researching the effects of yoga and ayurveda. Dr. Telles has 159 publications indexed in bibliographic databases, is first or main author on most of these, has 17 chapters in books and has written 3 books.



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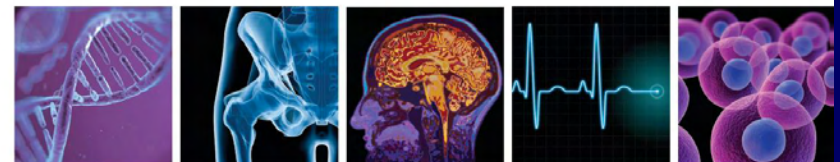
THE PRINCIPLES AND PRACTICE OF YOGA IN HEALTH CARE

Khalsa et al



THE PRINCIPLES AND PRACTICE OF YOGA IN HEALTH CARE

Sat Bir Singh Khalsa • Lorenzo Cohen
Timothy McCall • Shirley Telles



Forewords by

D Ornish, MD • BM Hegde, MD, PhD, FRCP



- 23 chapters with theory, rationale, research & practice
- ~60 chapter contributors, ~30 yoga therapist contributors

News & Press: Latest News

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Announcing Sat Bir Khalsa, PhD and Laura Schmalzl, PhD as New Editors for the IJYT!

Wednesday, April 15, 2015 (0 Comments)

Posted by: John Kepner

We are pleased and proud to announce Sat Bir Khalsa, PhD, as Editor in Chief of the *International Journal of Yoga Therapy* and Laura Schmalzl, PhD, RYT, as our new Managing Editor. Will Boggs, MD, will return to the Editorial Board.



Sat Bir brings an unparalleled reputation in the international yoga research community. He has also served as Chair of IAYT's Scientific Program Committee since SYTAR 2008. Dr. Khalsa has grown that position enormously for the Symposium on Yoga Research since 2010.

Laura has a remarkable international background, holding research positions in Australia and Sweden, before her current position at UC-San Diego. She is also an *Associate Editor for Frontiers in Human Neuroscience* and speaks five languages.

For more background on both editors, see their bios on the IAYT Management page.



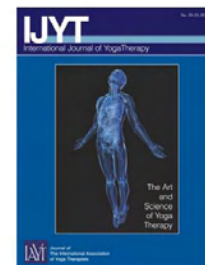
Renew Your Membership

About the International Journal of Yoga Therapy

The *International Journal of Yoga Therapy (IJYT)* is an annual, peer-reviewed journal serving yoga practitioners, yoga teachers, yoga therapists, health professionals, and yoga researchers. We publish scholarly and research-based submissions related to any tradition or aspect of yoga therapy. An annual electronic Supplement provides abstracts from IAYT's Symposium on Yoga Therapy and Research (SYTAR). The IJYT is published in October. Digital access to back issues is available through 2002.

Each issue contains

- Perspectives - non-peer-reviewed editorials on any issue related to the research and practice of yoga therapy.
- Issues in Yoga Therapy - peer-reviewed scholarly articles that address issues, challenges, and controversies in the research and practice of yoga therapy.
- Research - reports of original research and case studies.
- Yoga Therapy in Practice - continuing education articles describing specific approaches to yoga therapy.



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Yoga Research Journals

- Yoga Mimamsa (1924)
- International Journal of Yoga Therapy (1990)
- International Journal of Yoga (2008)
- Indian Journal of Ancient Medicine and Yoga (2008)
- Journal of Yoga and Physical Therapy (2011)
- International Scientific Yoga Journal SENSE (2011)
- International Journal of Yoga and Allied Sciences (2012)
- International Journal of AYUSH: Ayurveda, Yoga, Unani ,Siddha and Homeopathy (2012)
- Journal of Advanced Research in Ayurveda, Yoga, Unani, Siddha and Homeopathy (2014)
- Journal of Yoga and Physiotherapy (2016)
- International Journal of Advanced Ayurveda, Yoga, Unani, Siddha and Homeopathy (2016)
- International Journal of Yoga, Physiotherapy and Physical Education (2016)
- MOJ Yoga & Physical Therapy (2016)
- International Journal of Yoga Natural Therapy (newly founded)



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WHO WE ARE

We've changed our name! The Consortium of Academic Health Centers for Integrative Medicine is now the Academic Consortium for Integrative Medicine & Health (The Consortium)

As an organization we are committed to sharing information and ideas, meeting challenges together in a process grounded by the values of integrative medicine, supporting member institutions, and providing a national voice for the advancement of integrative principles.

WHAT WE DO

The mission of the Consortium is to advance integrative medicine and health through academic institutions and health systems.

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ate! Integrative Medicine and Health 2016 International Congress is May 17 - 20, 2016 in Las Vegas, NV!



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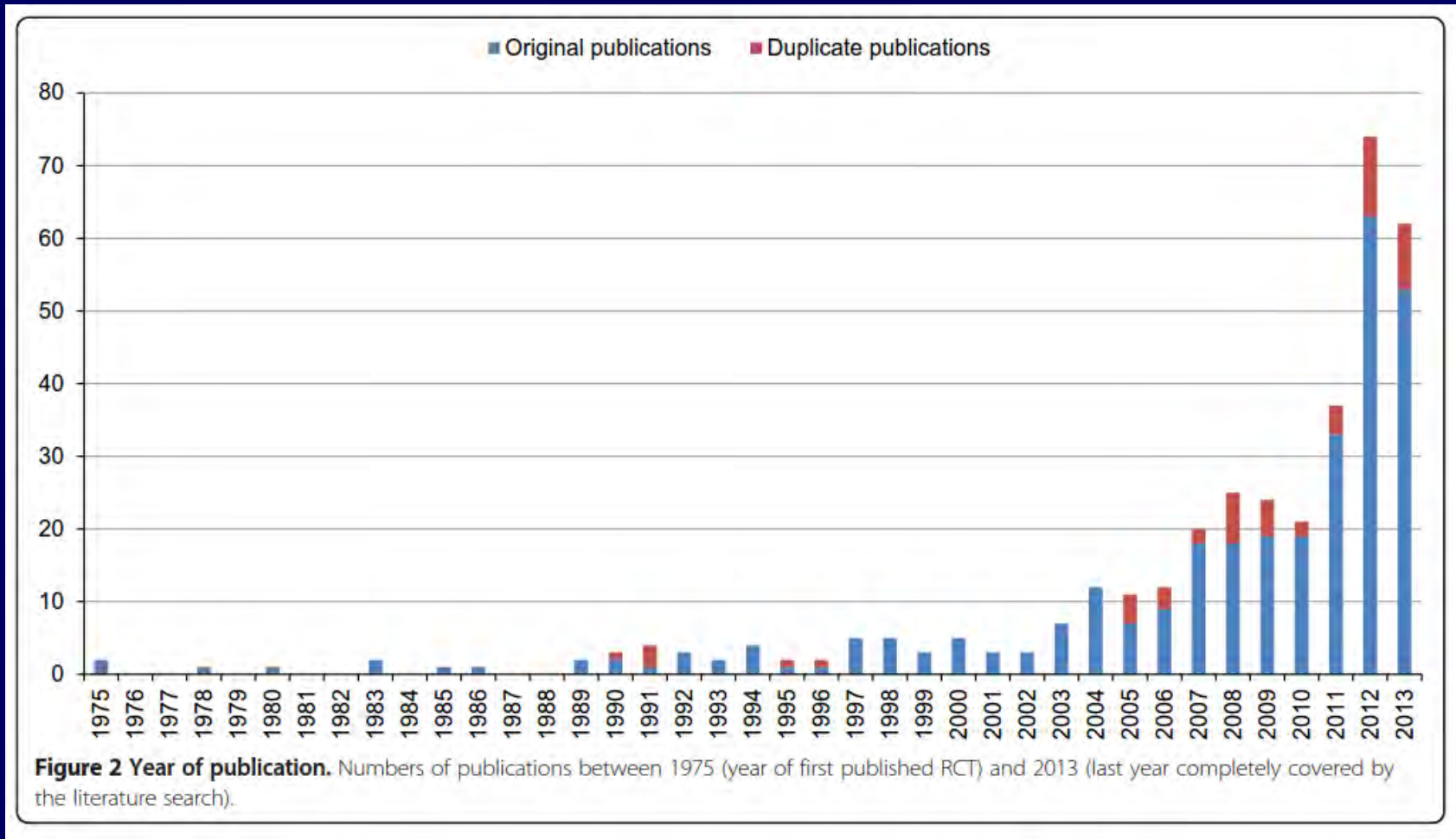
* First Name

[IMPORTANT DATES](#)

April 27, 2015

Pre-Congress
Workshop
Application Period

Chronology of Yoga RCT's



From: *Characteristics of randomized controlled trials of yoga: a bibliometric analysis*, Cramer H, Lauche R, Dobos G, *BMC Complementary & Alternative Medicine*,14:328, 2014.

Publication Source Yoga RCT's

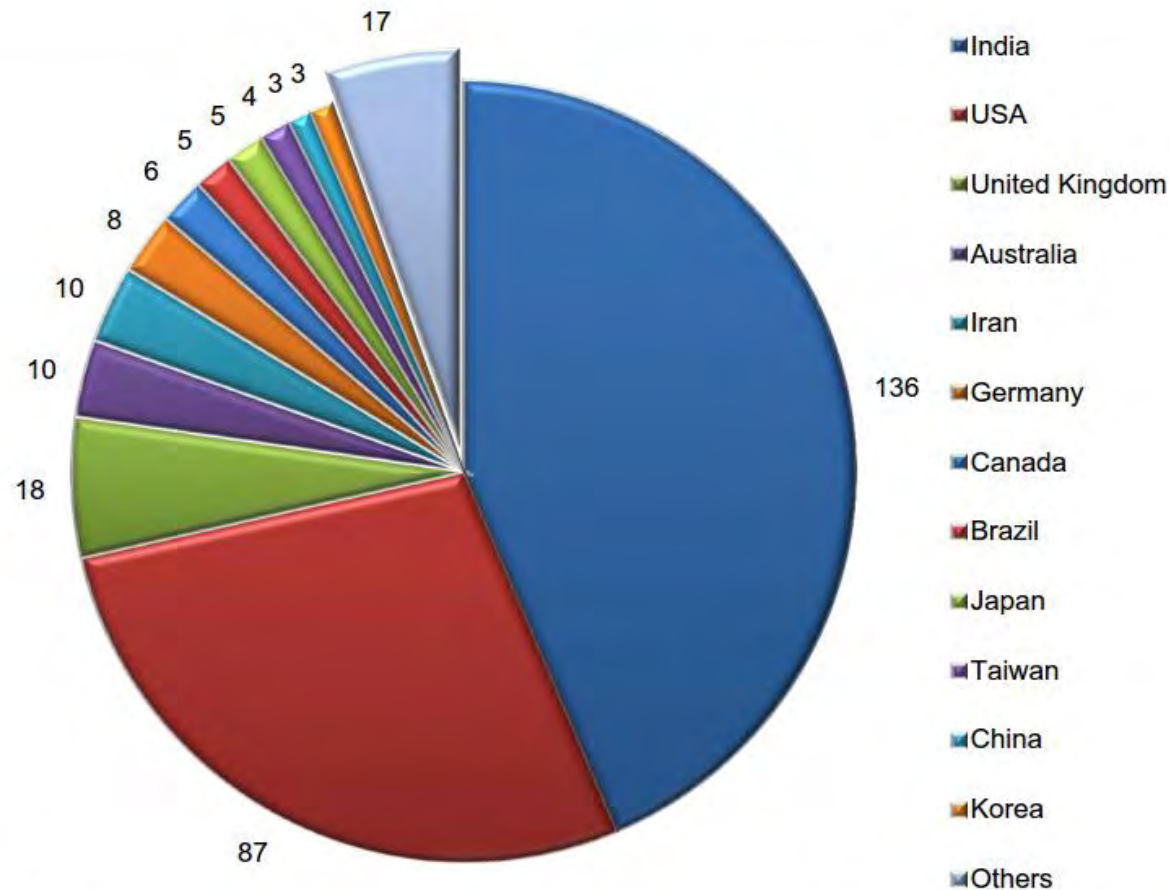


Figure 3 Origin of RCTs. Number of RCTs (not publications) classified according to country in descending order. Others = countries with just 1 RCT.

From: *Characteristics of randomized controlled trials of yoga: a bibliometric analysis*, Cramer H, Lauche R, Dobos G, *BMC Complementary & Alternative Medicine*,14:328, 2014.

From: *Characteristics of randomized controlled trials of yoga: a bibliometric analysis*, Cramer H, Lauche R, Dobos G, *BMC Complementary & Alternative Medicine*,14:328, 2014.

Figure 4 Medical conditions. Number of RCTs classified according to condition in descending order. Others = conditions that were studied in just 1 or 2 RCT.

Medical Condition	Number of RCTs
Healthy	84
Any	23
Breast cancer	17
Asthma	14
Depression	14
Type 2 diabetes mellitus	13
Chronic low back pain	11
Hypertension	11
Pregnancy	8
Schizophrenia	8
Menopausal symptoms	7
Multiple sclerosis	7
Metabolic syndrome	6
Stress	5
Coronary artery disease	4
COPD	3
All cancer types	3
Chronic neck pain	3
Eating disorder	3
Fibromyalgia	3
Heart failure	3
Menstrual irregularities	3
Osteoarthritis	3
Overweight/obesity	3
Smoking	3
Substance abuse	3
Others	47

Chronology of Yoga Therapy RCT's

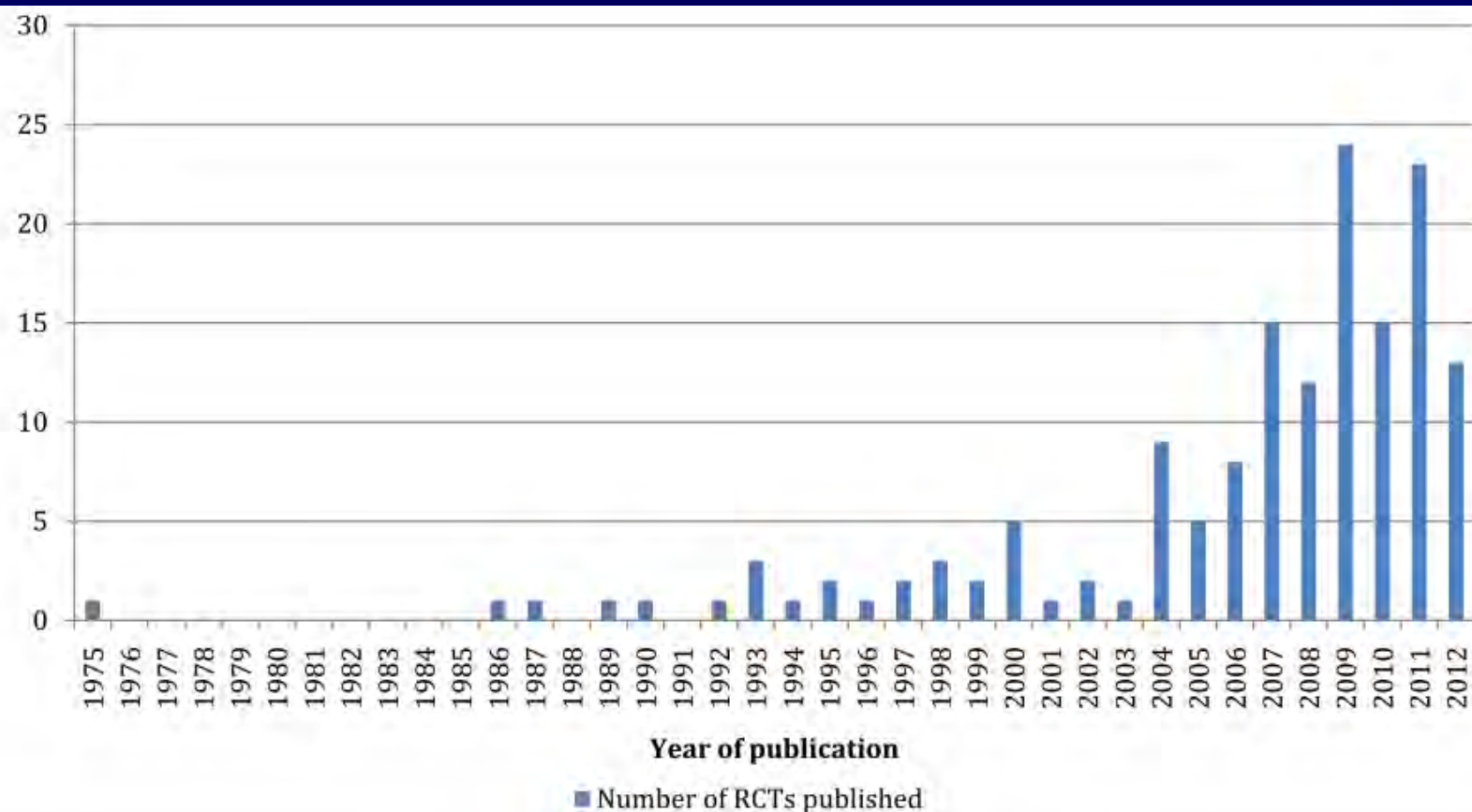


Figure 2. Number of RCTs published from 1975 through April 27, 2012

From: *A systematic scoping review of yoga intervention components and study quality*, Elwy AR, Groessl EJ, Eisen SV, Riley KE, Maiya M, Lee JP, Sarkin A, Park CL, *American Journal of Preventive Medicine*, 47:220-32, 2014.

Yoga as a Therapeutic Intervention: A Bibliometric Analysis of Published Research Studies from 1967 to 2013

Pamela E. Jeter, PhD,^{1,2} Jeremiah Slutsky, BS,³ Nilkamal Singh, MSc,^{4,5} and Sat Bir S. Khalsa, PhD⁶

Abstract

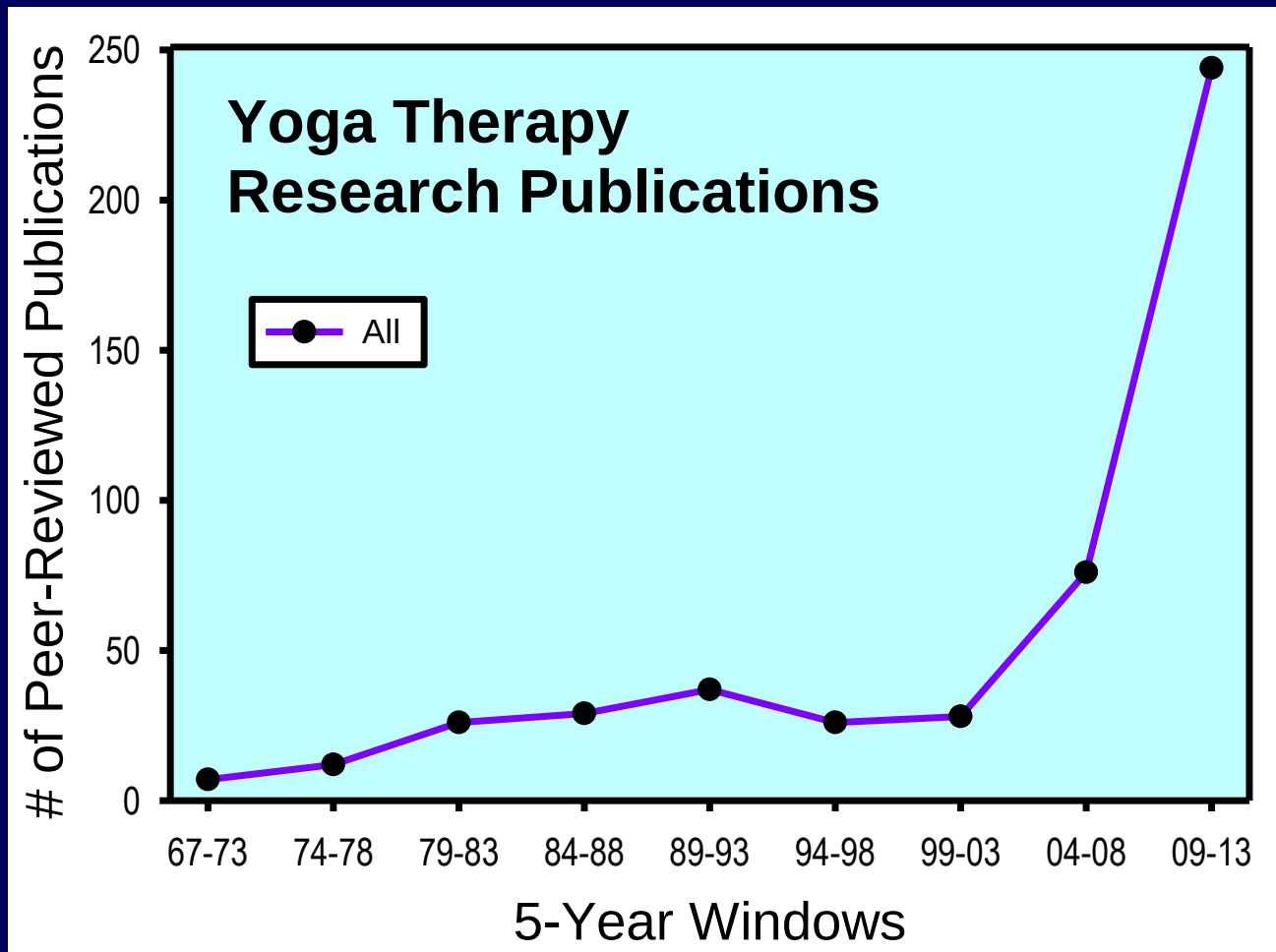
Objective: A comprehensive bibliometric analysis was conducted on publications for yoga therapy research in clinical populations.

Methods: Major electronic databases were searched for articles in all languages published between 1967 and 2013. Databases included PubMed, PsychInfo, MEDLINE, IndMed, Indian Citation Index, Index Medicus for South-East Asia Region, Web of Knowledge, Embase, EBSCO, and Google Scholar. Nonindexed journals were searched manually. Key search words included *yoga*, *yoga therapy*, *pranayama*, *asana*. All studies met the definition of a clinical trial. All styles of yoga were included. The authors extracted the data.

Results: A total of 486 articles met the inclusion criteria and were published in 217 different peer-reviewed journals from 29 different countries on 28,080 study participants. The primary result observed is the three-fold increase in number of publications seen in the last 10 years, inclusive of all study designs. Overall, 45% of the studies published were randomized controlled trials, 18% were controlled studies, and 37% were uncontrolled studies. Most publications originated from India ($n=258$), followed by the United States ($n=122$) and Canada ($n=13$). The top three disorders addressed by yoga interventions were mental health, cardiovascular disease, and respiratory disease.

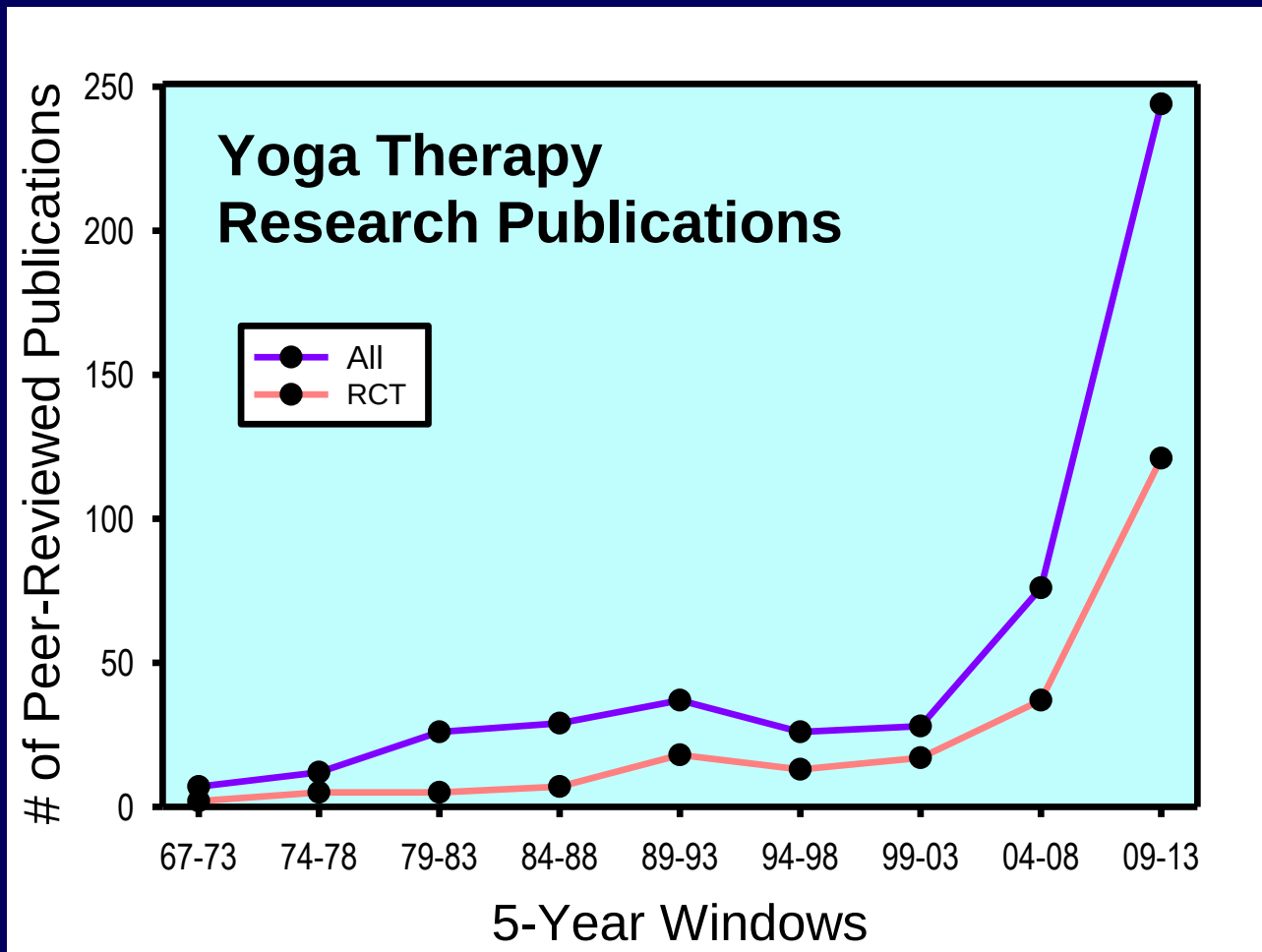
Conclusion: A surge in publications on yoga to mitigate disease-related symptoms in clinical populations has occurred despite challenges facing the field of yoga research, which include standardization and limitations in funding, time, and resources. The population at large has observed a parallel surge in the use of yoga outside of clinical practice. The use of yoga as a complementary therapy in clinical practice may lead to health benefits beyond traditional treatment alone; however, to effect changes in health care policy, more high-quality, evidence-based research is needed.

Chronology of Yoga Therapy Research



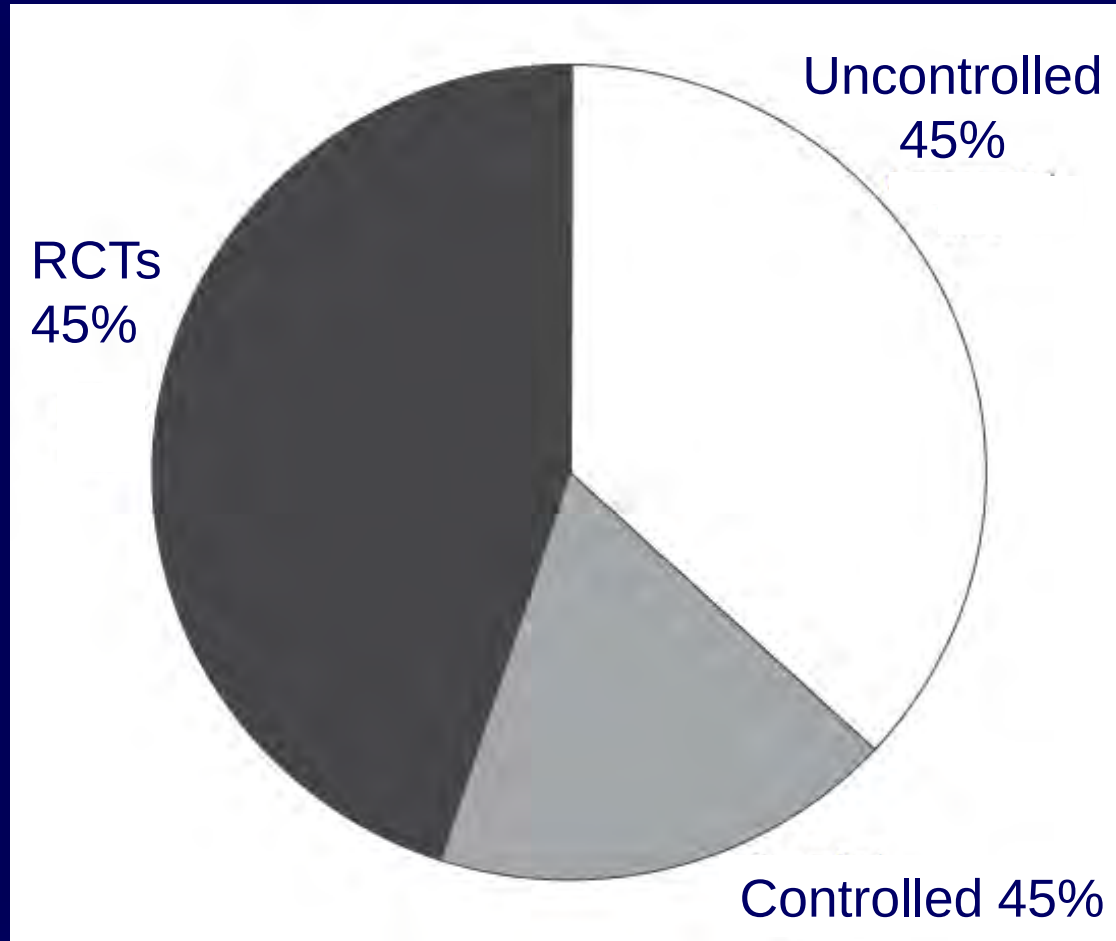
From: *Yoga as a therapeutic intervention: A bibliometric analysis of published research studies from 1967-2013*, Jeter PE, Slutsky J, Singh N, Khalsa SBS, *Journal of Alternative and Complementary Medicine*, 21:586-92, 2015.

Chronology of Yoga Therapy Research



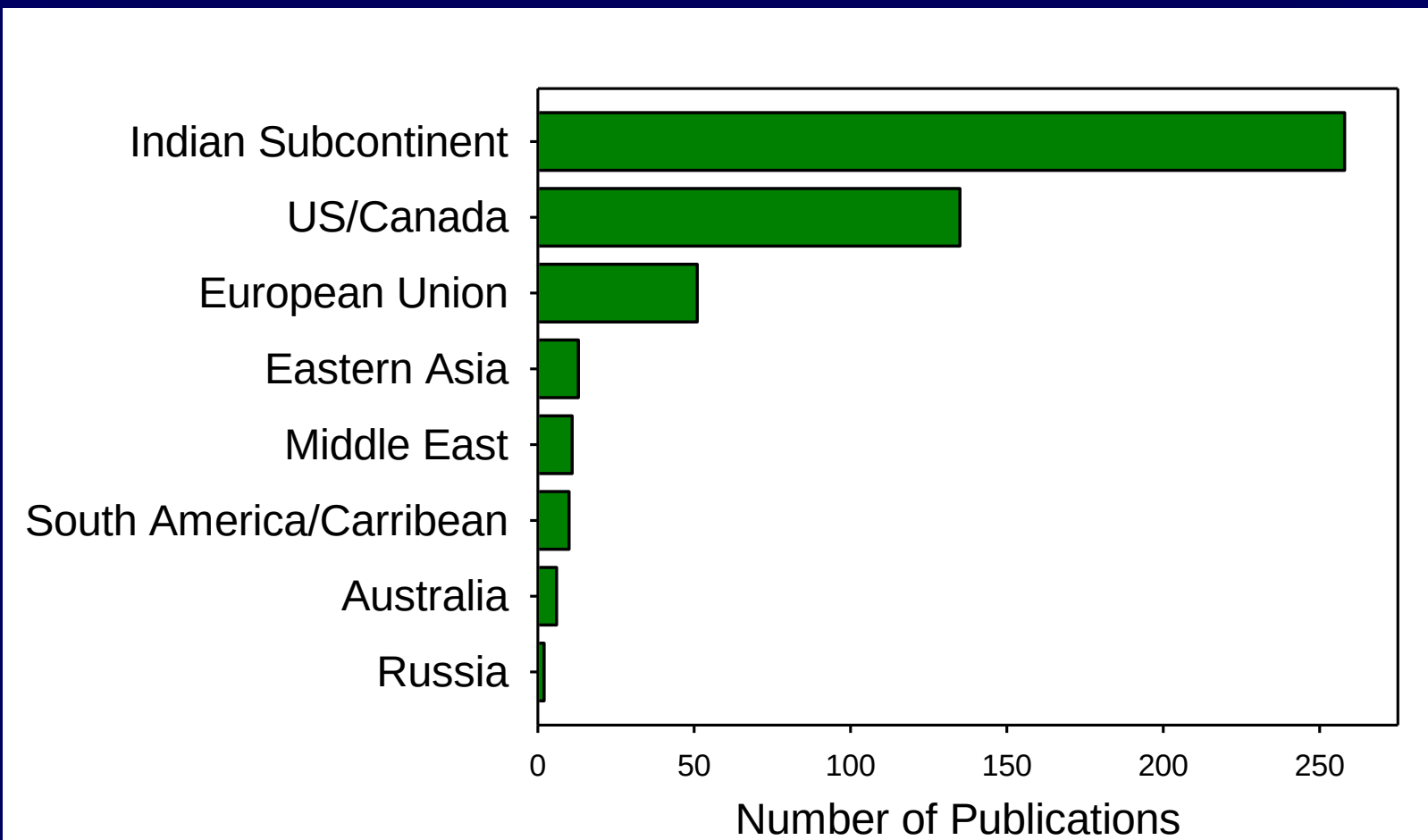
From: *Yoga as a therapeutic intervention: A bibliometric analysis of published research studies from 1967-2013*, Jeter PE, Slutsky J, Singh N, Khalsa SBS, *Journal of Alternative and Complementary Medicine*, 21:586-92, 2015.

Yoga Therapy Research Design



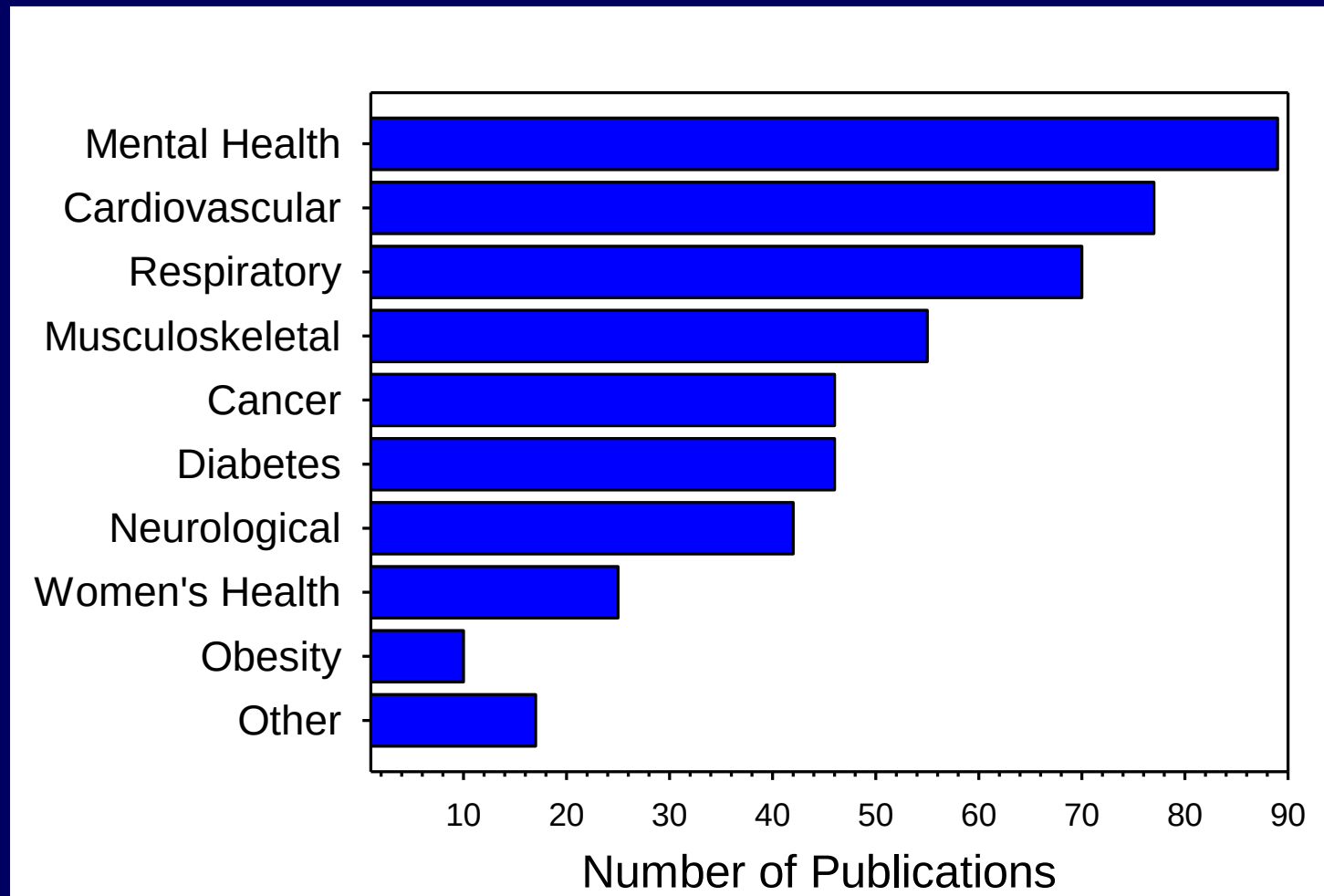
From: *Yoga as a therapeutic intervention: A bibliometric analysis of published research studies from 1967-2013*, Jeter PE, Slutsky J, Singh N, Khalsa SBS, *Journal of Alternative and Complementary Medicine*, 21:586-92, 2015.

Yoga Therapy Publication Sources



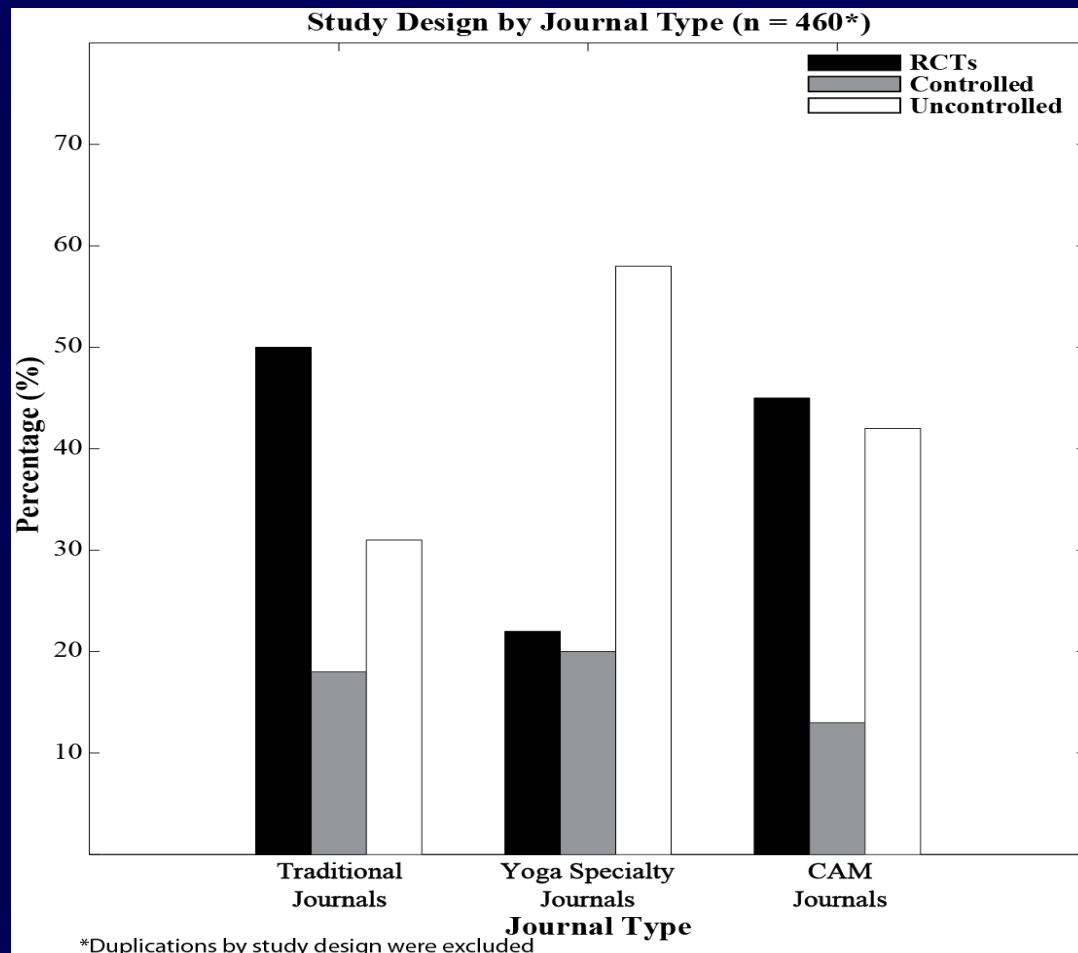
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Yoga Therapy Research by Disorders



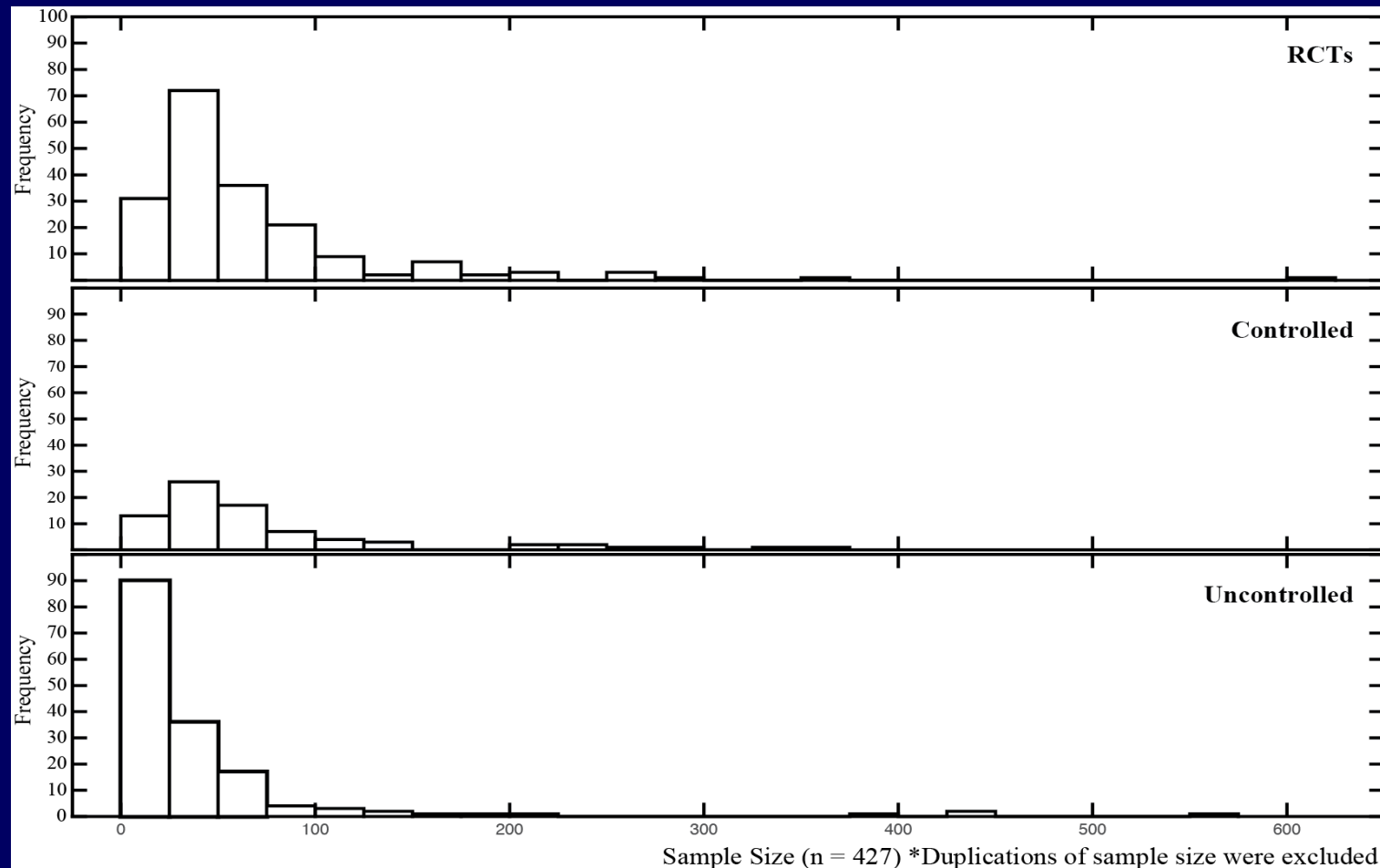
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Yoga Therapy Research Quality



From: *Yoga as a therapeutic intervention: A bibliometric analysis of published research studies from 1967-2013*, Jeter PE, Slutsky J, Singh N, Khalsa SBS, *Journal of Alternative and Complementary Medicine*, 21:586-92, 2015.

Yoga Therapy Research Quality



From: *Yoga as a therapeutic intervention: A bibliometric analysis of published research studies from 1967-2013*, Jeter PE, Slutsky J, Singh N, Khalsa SBS, *Journal of Alternative and Complementary Medicine*, 21:586-92, 2015.

Control Conditions Yoga RCT's

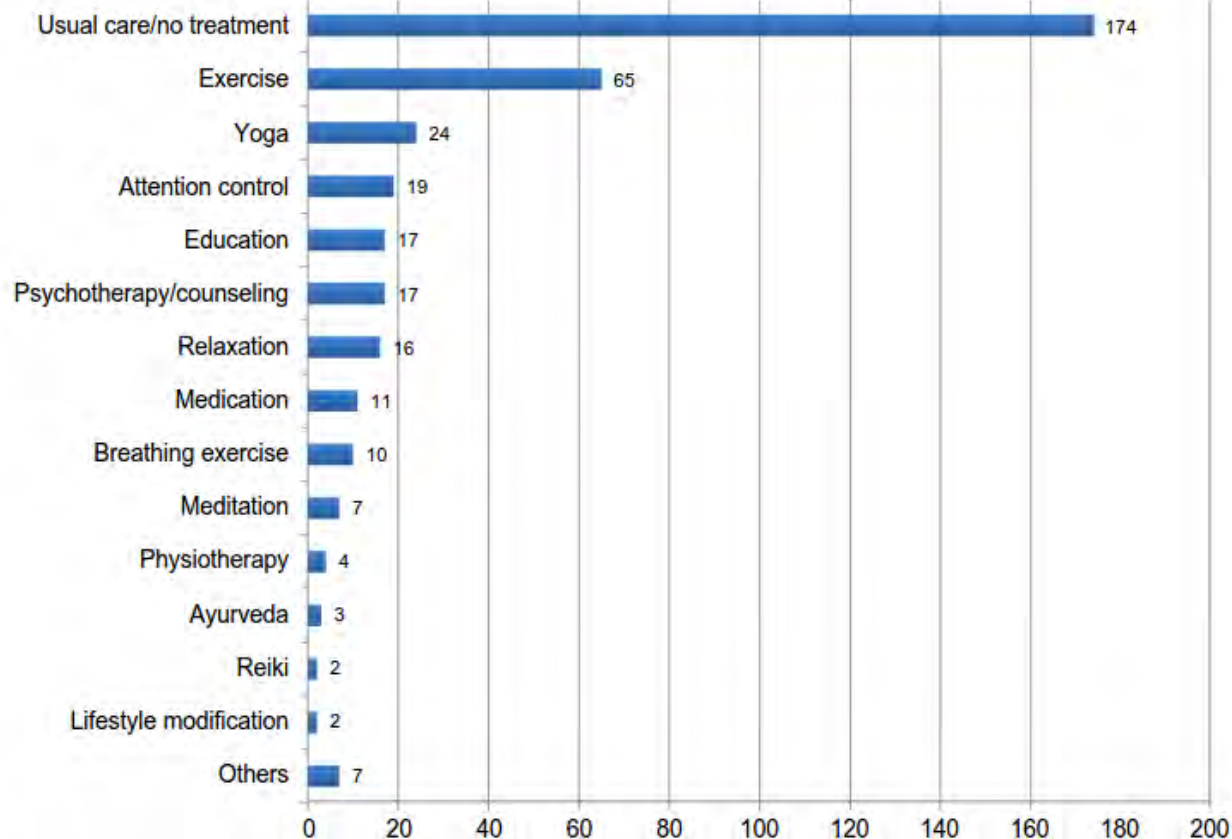


Figure 6 Control interventions. Number of RCTs classified according to control intervention. Others = control interventions that were used in just 1 RCT.

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