



Scientific Research on Yoga and Disease Prevention

Yoga Alliance Webinar June 18, 2020

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Non-communicable Diseases (NCDs) (Lifestyle Diseases/Chronic Diseases)

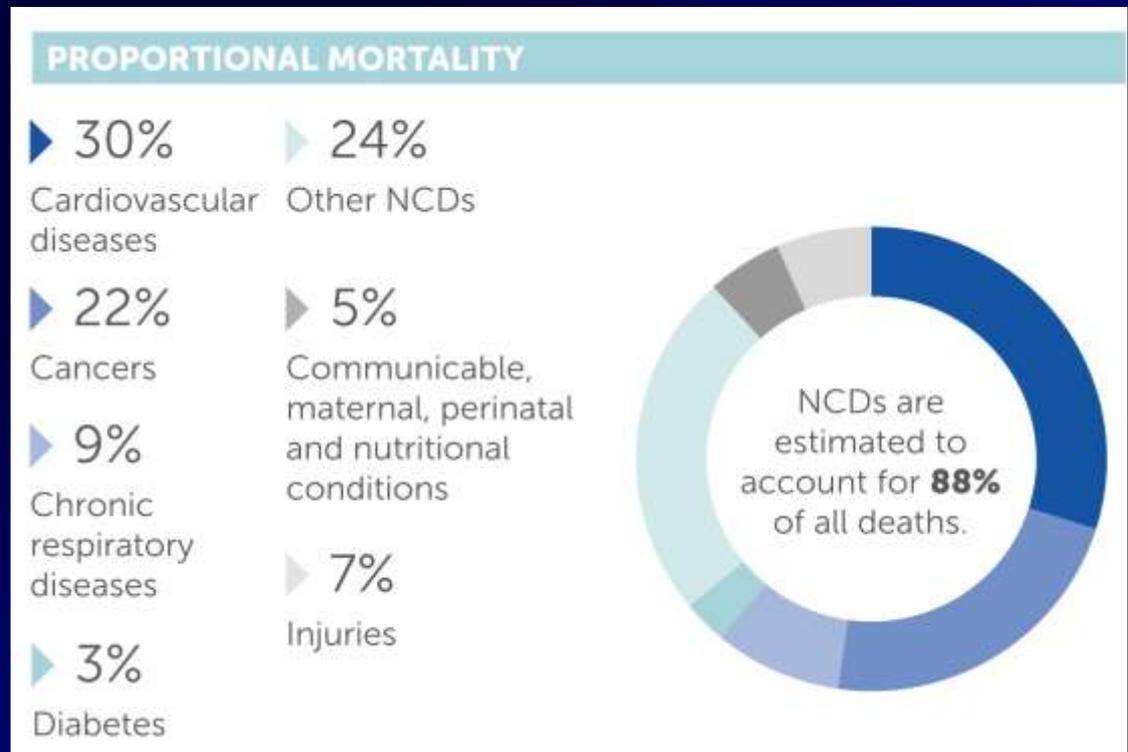
“NCDs are by far the leading cause of death worldwide. In 2016, they were responsible for 71% ... deaths which occurred globally.”

“The world is reaching an inflection point.”

“...15 million people will continue to die each year from NCDs in the prime of their lives...”

“Most of these deaths tomorrow can be avoided...”

Noncommunicable Diseases, Country Profiles, World Health Organization, 2018





National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP)

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About Chronic Diseases

Health and Economic Costs of Chronic Diseases

How You Can Prevent Chronic Diseases

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About Chronic Diseases

Six in ten adults in the US have a chronic disease and **four in ten adults** have two or more.



HEART DISEASE



CANCER



CHRONIC LUNG DISEASE



STROKE



ALZHEIMER'S DISEASE



DIABETES



CHRONIC KIDNEY DISEASE



“90% of the nation’s \$3.3 trillion in annual health care expenditures are for people with chronic and mental health conditions”

<https://www.cdc.gov/chronicdisease/about/costs/index.htm>; accessed 6/14/19

Opioid overdoses accounted for more than 42,000 deaths in 2016, more than any previous year on record.

<https://www.hhs.gov/opioids/about-the-epidemic/index.html>; accessed 6/7/18

... significant increase in the percentage of Americans who had experienced at least one symptom of stress in the past month, from 71 percent in 2016 to 75 percent in 2017

<https://www.apa.org/news/press/releases/stress/2017/state-nation.pdf>

Risk Factors

Physical Inactivity

Unhealthy Diet

Unhealthy Behaviors

Chronic Stress

From:
Developmental origins of noncommunicable disease: population and public health implications,
Hanson M,
Gluckman P,
American Journal of Clinical Nutrition,
94:1754S–8S, 2011.

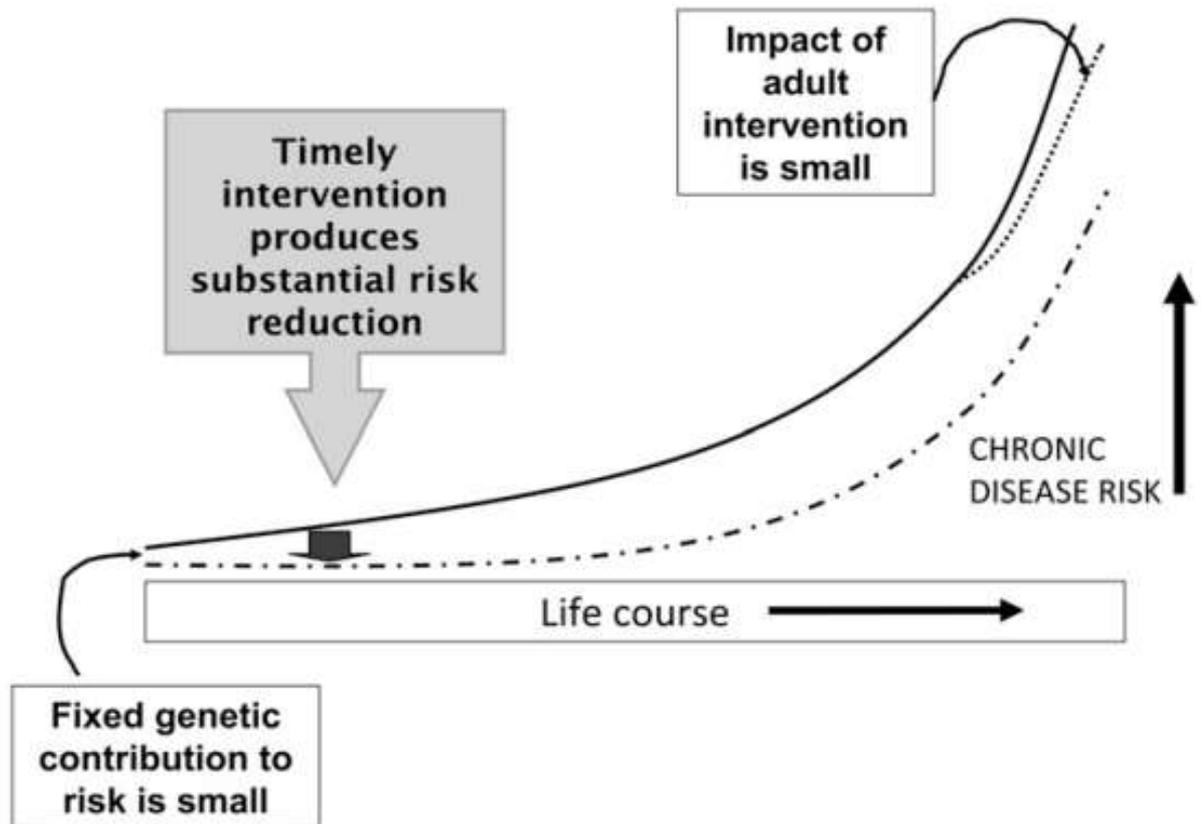


FIGURE 1. Risk of noncommunicable disease increases along a trajectory through the life course, contrasting with models on the basis of infectious disease. The inherited, fixed genetic variation makes only a small contribution to later risk. In addition, because they occur too late, adult lifestyle interventions reduce risk to only a small degree or transiently. The maximum effect will be gained from timely interventions in early life when plasticity permits a sustained reduction in the trajectory of risk to be attained.

Health Behavior Change Following Chronic Illness in Middle and Later Life

Jason T. Newsom,¹ Nathalie Huguet,¹ Michael J. McCarthy,² Pamela Ramage-Morin,³ Mark S. Kaplan,¹ Julie Bernier,³ Bentson H. McFarland,⁴ and Jillian Oderkirk³

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²School of Social Work, University of Cincinnati, Ohio.

³Health Analysis Division, Statistics Canada, Ottawa, Ontario.

⁴Department of Psychiatry, Oregon Health and Science University, Portland.

Objectives. Understanding lifestyle improvements among individuals with chronic illness is vital for targeting interventions that can increase longevity and improve quality of life.

Methods. Data from the U.S. Health and Retirement Study were used to examine changes in smoking, alcohol use, and exercise 2–14 years after a diagnosis of heart disease, diabetes, cancer, stroke, or lung disease.

Results. Patterns of behavior change following diagnosis indicated that the vast majority of individuals diagnosed with a new chronic condition did not adopt healthier behaviors. Smoking cessation among those with heart disease was the largest observed change, but only 40% of smokers quit. There were no significant increases in exercise for any health condition. Changes in alcohol consumption were small, with significant declines in excessive drinking and increases in abstinence for a few health conditions. Over the long term, individuals who made changes appeared to maintain those changes. Latent growth curve analyses up to 14 years after diagnosis showed no average long-term improvement in health behaviors.

Discussion. Results provide important new information on health behavior changes among those with chronic disease and suggest that intensive efforts are required to help initiate and maintain lifestyle improvements among this population.

Yoga Practices

Postures, Breathing, Relaxation, Meditation

Fitness

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

Self-Regulation

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

Awareness

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

Spirituality

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

Global Human Functionality

↑Physical & Mental Health, ↑Physical Performance
↑Stress & Emotion Regulation, ↑Awareness/Mindfulness, ↑Meta-cognition
↑Positive Behavior, ↑Wellbeing, ↑Values, ↑Life Purpose & Meaning, ↑Spirituality

Sustaining Lifestyle Behavior Change

“Individuals generally recognize the need for behavior change, but are still unable to change their behavior. Thus, it is necessary to empower individuals to take an active role in self-regulating their health behaviors on an ongoing basis to improve health outcomes. Individual empowerment, the concept that “human beings have the right and ability to choose by and for themselves,” is a key concept to promoting healthy behaviors.”

“...enhancing mindfulness thorough mind-body practices (eg, meditation, yoga) is related to improvements in lifestyle change...For example, noticing the effects of food on the body may influence the desire for an improved diet and result in weight loss (eg, “I notice that I feel sluggish after eating fried food and would like to eat it less so that I am more able to concentrate on my work”)

From: *Complementary Tools to Empower and Sustain Behavior Change: Motivational Interviewing and Mindfulness*. Sohl SJ, Birdee G, Elam R, *American Journal of Lifestyle Medicine*, 10:429-436, 2016.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5319432/pdf/10.1177_1559827615571524.pdf

Mindfulness Facilitates Intention

“...mindful individuals are more likely to carry out their intentions than are less-mindful individuals”

“...heightened awareness and attention to inner experiences and environmental influences, characterizing mindful individuals, facilitate a successful translation of intentions into actions.”

“...strengthening the ability for self control, that is, the ability to stay focused on the fulfillment of plans and control counterintentional thoughts that often detract people from acting on their intentions.”

“...mindful individuals are more likely to exercise control over counterintentional habits than are less-mindful individuals.”

“...mindfulness shields intentions from counterintentional habits.”

From: Mindfulness and the intention-behavior relationship within the theory of planned behavior. Chatzisarantis NL, Hagger MS, Personality & Social Psychology Bulletin, 33:663-76, 2007.

Risk Factors

Yoga

Physical Inactivity

Fitness

Unhealthy Diet

Self-Regulation

Unhealthy Behaviors

Awareness

Chronic Stress

Spirituality

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 text book, with contributions by multiple expert researchers and clinicians in the field.

- Integrates the theory and the practice of yoga practice
- Represents the integration of yoga theory as a credible profession
- Contributes to a more informed body of knowledge and the practical implications for practitioners within the yoga or other health care practice
- Provides a unique contribution to leading international research in yoga
- Provides the scientific evidence base for yoga for a wide variety of medical conditions
- Provides a list of contributors by region and discipline, including practical implications for health care practice by specific disciplines

The editors, through their own yoga practice research and are seasoned practitioners in the field. They have brought together an experienced team of researchers and yoga practice contributors.

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

THE PRINCIPLES AND PRACTICE OF YOGA IN HEALTH CARE
NANDA ET AL

CHAPTER TWENTY-ONE YOGA FOR PREVENTION AND WELLNESS

A ROSS • A MICHALSEN

Pathophysiology, etiology, and prevalence

Throughout history, individuals worldwide have died from diseases that were mostly communicable in nature. Top killers in 1900 included infectious diseases such as pneumonia, tuberculosis, and gastrointestinal infections (Jones, Podolsky, & Greene, 2012). Today, with the advent of antibiotics and improved infection-control measures, deaths from infectious disease in developed countries are rare. At present, five of the top seven causes of mortality are noncommunicable in nature and lifestyle-related including heart disease, cancer, chronic lung disease, stroke, and type 2 diabetes (Jones et al., 2012). These diseases are becoming increasingly more common, with nearly one in two American adults having at least one chronic health condition (Bauer, Briss, Goodman, & Bowman, 2014). Worldwide, chronic, non-communicable diseases were responsible for 68% of deaths in 2012, up nearly 10% from the previous decade (World Health Organization, 2014). Chronic diseases such as diabetes can lead to complications such as heart attacks, blindness, and amputation that are debilitating to the individual and costly to the economy, with one in every five healthcare dollars in the United States spent on diabetes care (American Diabetes Association, 2008).

Chronic lifestyle-related health conditions are attributed primarily to a short list of risk factors, including poor nutrition and physical inactivity (both strongly related to obesity), tobacco use, excessive alcohol consumption, hypertension, and high cholesterol (Bauer et al., 2014). Obesity is a worldwide epidemic that underlies many chronic health conditions, including cardiovascular disease, type 2 diabetes (T2DM), and musculoskeletal disorders. Obesity-related health costs in the United States alone run to nearly \$150 billion per year (Finkelstein, Trogon, Cohen, & Dietz, 2009).

In the field of public health, there are three ways to manage disease: primary, secondary, and tertiary prevention. Primary prevention consists of measures taken to prevent disease or infirmity, while secondary prevention is the early diagnosis and treatment of conditions to prevent disease progression. Tertiary prevention focuses on treating established diseases to restore function and reduce complications. Treating chronic diseases using tertiary prevention is not only costly but ineffective; for example, only one-third to one-half of individuals with high cholesterol and hypertension are able to maintain adequate control (Hyre, Muntner, Menke, Raggi, & He, 2007). The key to changing the trajectory of the world's health and reducing skyrocketing health care costs lies in primary prevention through changing unhealthy lifestyles. Reducing blood pressure, body weight, blood sugar, and cholesterol by only 1% could save \$83 to \$103 per person annually in medical costs (Henke et al., 2010). Yoga shows promise as a lifestyle intervention for improving many of the risk factors associated with chronic disease. As such, yoga is preventive medicine.

Scientific rationale for yoga as preventive medicine

In order to understand how yoga is preventive medicine, one must understand the physiology underlying the development of lifestyle-related diseases. According to the theory of allostasis, lifestyle-related diseases result from dysfunction of the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic-adrenal-medullary (SAM) system in response to chronic exposure to stress (McEwen & Gianaros, 2010). When an individual experiences a real or perceived threat, whether it is a major life event, a trauma, a work-related, family-related, or a societal stressor, a network within the brain that includes the amygdala, the hippocampus, and the

[Intervention Review]

Yoga for the primary prevention of cardiovascular disease

Louise Hartley¹, Mariana Dyakova¹, Jennifer Holmes², Aileen Clarke¹, Myeong Soo Lee³, Edzard Ernst⁴, Karen Rees¹

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Editorial group: Cochrane Heart Group.

Publication status and date: Edited (no change to conclusions), published in Issue 6, 2014.

Citation: Hartley L, Dyakova M, Holmes J, Clarke A, Lee MS, Ernst E, Rees K. Yoga for the primary prevention of cardiovascular disease. *Cochrane Database of Systematic Reviews* 2014, Issue 5. Art. No.: CD010072. DOI: [10.1002/14651858.CD010072.pub2](https://doi.org/10.1002/14651858.CD010072.pub2).

“The results showed that yoga has favourable effects on diastolic blood pressure, high-density lipoprotein (HDL) cholesterol and triglycerides (a blood lipid), and uncertain effects on low-density lipoprotein (LDL) cholesterol.”

<https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD010072.pub2/epdf/full>

Yoga for metabolic syndrome: A systematic review and meta-analysis

**Holger Cramer^{1,2}, Jost Langhorst¹, Gustav Dobos¹
and Romy Lauche^{1,2}**

European Journal of Preventive
Cardiology

2016, Vol. 23(18) 1982–1993

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“...yoga can be preliminarily considered to be a safe and effective intervention in order to reduce waist circumference and systolic blood pressure. Yoga might be considered as an alternative approach for patients who are not adhering to conventional forms of exercise.”

Original scientific paper

European Journal of
**Preventive
Cardiology**



The effectiveness of yoga in modifying risk factors for cardiovascular disease and metabolic syndrome: A systematic review and meta-analysis of randomized controlled trials

**Paula Chu^{1,2}, Rinske A Gotink^{3,4}, Gloria Y Yeh⁵, Sue J Goldie^{2,6}
and MG Myriam Hunink^{2,3,4,6}**

European Journal of Preventive
Cardiology
2016, Vol. 23(3) 291–307
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DOI: 10.1177/2047487314562741
ejpc.sagepub.com


“Compared to non-exercise controls, yoga showed significant improvement for body mass index, systolic blood pressure, low-density lipoprotein cholesterol, and high-density lipoprotein cholesterol. Significant changes were seen in body weight, diastolic blood pressure, total cholesterol, triglycerides, and heart rate, but not fasting blood glucose nor glycosylated hemoglobin.”

“This review demonstrates the potential of yoga to have an impact on concrete, physiological outcomes that represent some of the greatest health burdens today.”



Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed



Review Article

A systematic review and meta-analysis on the effects of yoga on weight-related outcomes



Romy Lauche ^{a,b}, Jost Langhorst ^a, Myeong Soo Lee ^c, Gustav Dobos ^a, Holger Cramer ^{a,b,*}

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^b Australian Research Centre in Complementary and Integrative Medicine (ARCCIM), University of Technology Sydney, Sydney, Australia

^c Medical Research Division, Korea Institute of Oriental Medicine, Daejeon, South Korea

“...yoga can however be preliminarily considered a safe and effective intervention to reduce body mass index in overweight or obese but otherwise healthy adults.”

“...yoga can be specifically considered as an alternative to other forms of physical activity for overweight/obese individuals who are not adherent to recommended physical activity regimens.”

Review Article

The Roles of Exercise and Yoga in Ameliorating Depression as a Risk Factor for Cognitive Decline

Danielle C. Mathersul^{1,2,3} and Simon Rosenbaum^{4,5}

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“Depression is a potentially modifiable risk factor for dementia. Both exercise and yoga are effective treatments for depression and cognitive decline that are also relatively easy and cost-effective to implement.”

<http://downloads.hindawi.com/journals/ecam/2016/4612953.pdf>



Contents lists available at [ScienceDirect](#)

Diabetes & Metabolic Syndrome: Clinical Research & Reviews

journal homepage: www.elsevier.com/locate/dsx



Review

A narrative review on role of Yoga as an adjuvant in the management of risk factor, disease progression and the complications of type 2 diabetes mellitus



A. Mooventhan

Department of Research and Development, S-VYASA University, Bengaluru, Karnataka, India

“Yoga practices have shown to have a role in the prevention and the management of diabetes and its co-morbid conditions like obesity, hypertension and dyslipidemia through producing significant reduction in weight, waist-hip ratio, blood glucose levels, very low density lipoprotein cholesterol, low density lipoprotein cholesterol, total cholesterol, triglycerides and significantly increases high density lipoprotein cholesterol and helps in reducing the cardiovascular risk profile of diabetic.”



Review

Mind-Body Approaches to Prevention and Intervention for Alcohol and Other Drug Use/Abuse in Young Adults

Medicines 2018, 5, 64; doi:10.3390/medicines5030064

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“...mind–body approaches, such as meditation, distress tolerance, and yoga, may promote emotion regulation skills that allow young adults to manage their stressful experiences and distressing emotions without [alcohol and other drug] use.”

RESEARCH ARTICLE

Citation: Ramamoorthi R, Gahreman D, Skinner T, Moss S (2019) The effect of yoga practice on glycemic control and other health parameters in the prediabetic state: A systematic review and meta-analysis. PLoS ONE 14(10): e0221067. <https://doi.org/10.1371/journal.pone.0221067>

The effect of yoga practice on glycemic control and other health parameters in the prediabetic state: A systematic review and meta-analysis

Ramya Ramamoorthi^{1*}, Daniel Gahreman¹, Timothy Skinner², Simon Moss¹

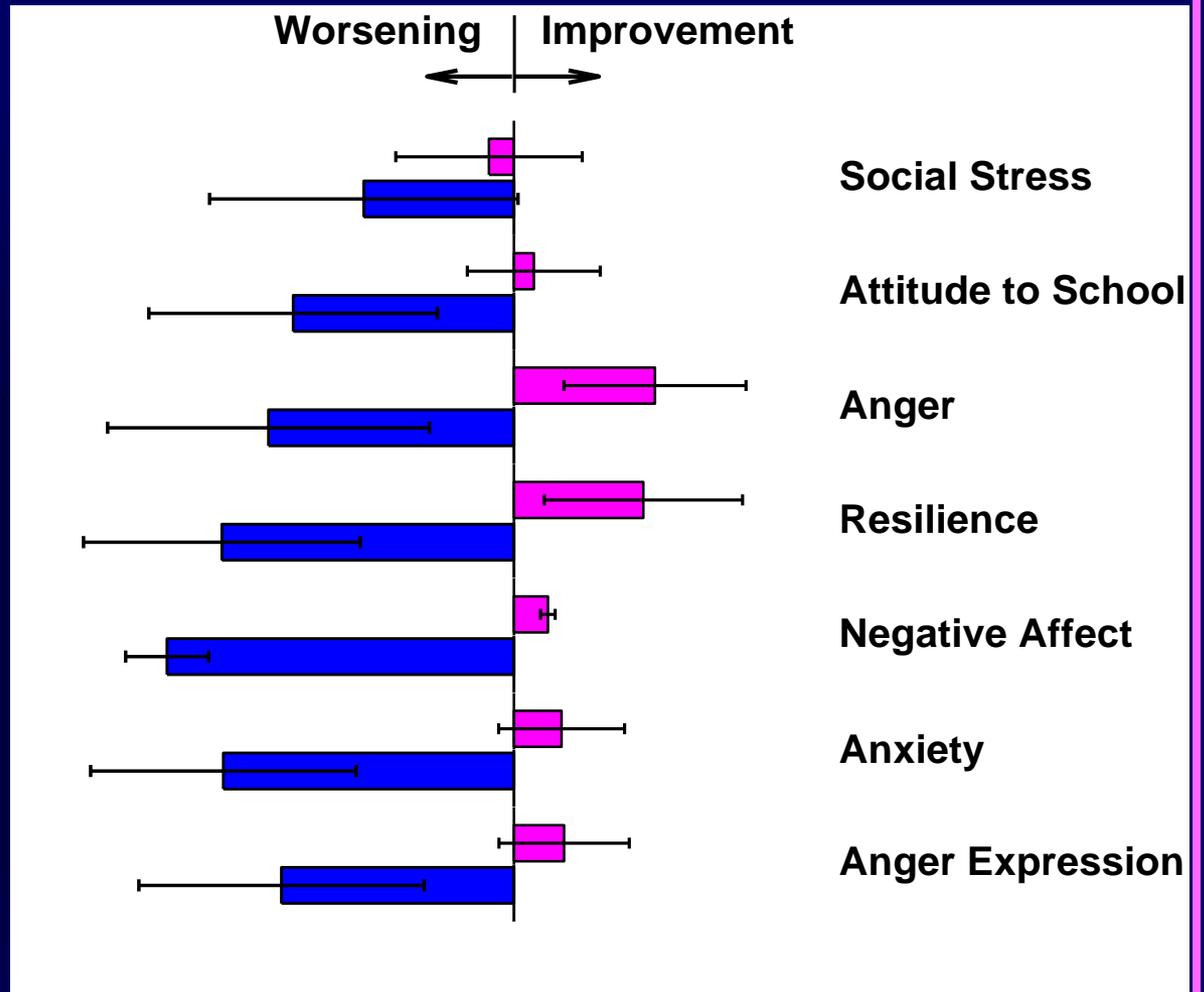
1 College of Health and Human Sciences, Charles Darwin University, Darwin, Northern Territory, Australia, **2** Københavns Universitet, Institut for Psykologi, Center for Sundhed og Samfund, Københavns Universitet, København K, Denmark

* Ramya.Ramamoorthi@cdu.edu.au

“Compared to controls, yoga intervention improved fasting blood glucose (FBG)...; low density lipoprotein (LDL)...; triglycerides...; total cholesterol ...; and systolic blood pressure... This meta-analysis uncovered clinically improved effects of yoga intervention on glycemic control, lipid profiles and other parameters of T2DM management in prediabetic population. These results suggest that yoga intervention may be considered as a comprehensive and alternative approach to preventing T2DM.”

<https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0221067&type=printable>

Yoga in High School



From: *Evaluation of the mental health benefits of yoga in a secondary school: a preliminary randomized controlled trial.* Khalsa SB, Hickey-Schultz L, Cohen D, Steiner N, Cope S, *Journal of Behavioral Health Services Research*, 39:80-90, 2012; *Benefits of yoga for psychosocial well-being in a US high school curriculum: a preliminary randomized controlled trial.* Noggle JJ, Steiner NJ, Minami T, Khalsa SB, *Journal of Developmental and Behavioral Pediatrics*, 33:193-201, 2012.

EMPIRICAL RESEARCH

Evaluation of Yoga for Preventing Adolescent Substance Use Risk Factors in a Middle School Setting: A Preliminary Group-Randomized Controlled Trial

Bethany Butzer¹ · Amanda LoRusso² · Sunny H. Shin³ · Sat Bir S. Khalsa²

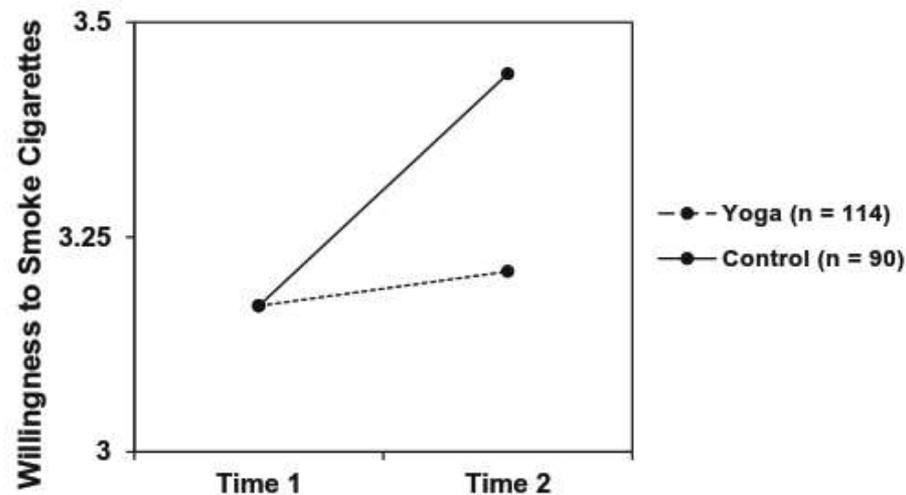


Fig. 3 Yoga and control group participants' willingness to smoke cigarettes at baseline (time 1) and end-program (time 2). ANCOVA on end-program scores (with baseline scores as a covariate) significant at $p < 0.05$

Yoga for Cardio-Metabolic Risk Factors

From: *Yoga training modulates adipokines in adults with high-normal blood pressure and metabolic syndrome.* Supriya R, Yu AP, Lee PH, Lai CW, Cheng KK, Yau SY, Chan LW, Yung BY, Siu PM, *Scandinavian Journal of Medicine & Science in Sports*, 28:1130-1138, 2018.

FIGURE 4 Adipokines in control and yoga groups. Line graphs represent the concentrations of leptin (A), plasminogen activator inhibitor-1 (B), chemerin (C), visfatin (D), and adiponectin (E) before (Pre) and after (Post) the 1-year experimental period in MetS subjects with high-normal blood pressure in control (n = 45) and yoga groups (n = 52). Statistical significance was set at $P < .05$. Data are expressed as the means \pm standard deviation

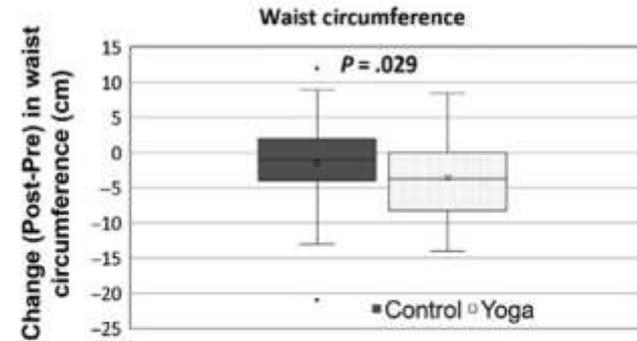
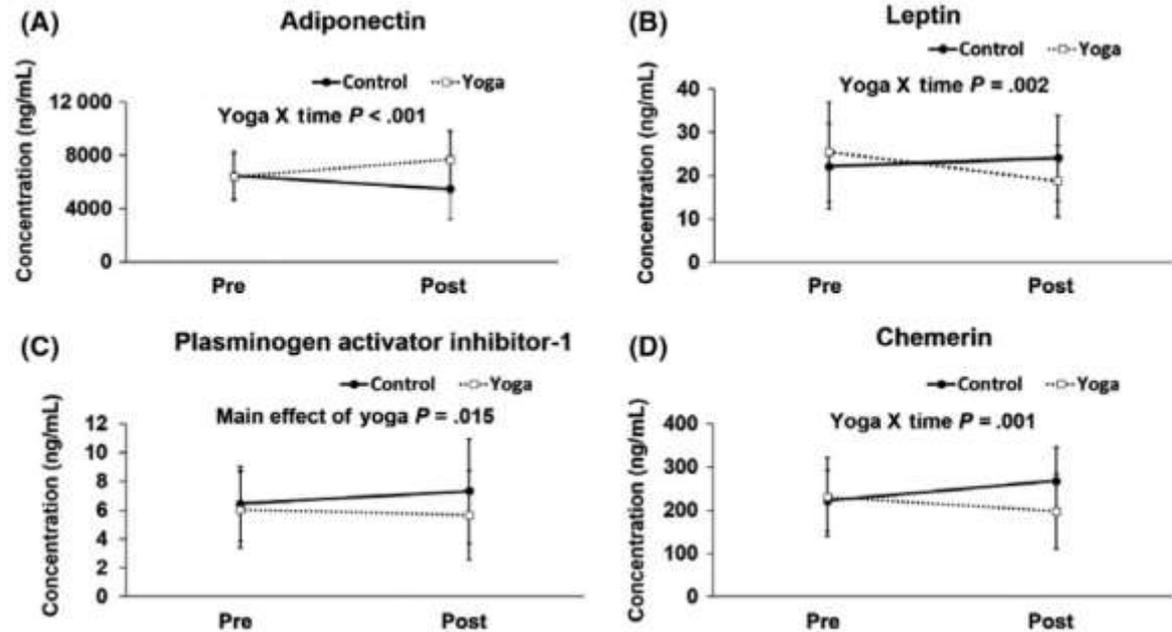


FIGURE 1 Change in waist circumference in control and yoga groups. The box plot represents the change (ie, post-pre) in waist circumference after yoga training in subjects with MetS and high-normal blood pressure. Statistical significance was set at $P < .05$

Yoga for Cardio-Metabolic Risk Factors

Table 3: Pre- and post-test values of selected variables after 12 weeks of yoga training

Outcome measures	Experimental group		P	Control group		P	Experimental versus control
	Baseline	3 months		Baseline	3 months		
Cholesterol (mg/dl)	170.0 (23.6)	157.7 (19.1)	0.000***	180.4 (26.0)	175.7 (23.3)	0.017*	0.006**
Triglyceride (mg/dl)	123.6 (69.7)	110.5 (43.6)	0.17	134.8 (58.2)	131.3 (54.4)	0.23	0.16
HDL (mg/dl)	39.1 (3.8)	40.8 (3.15)	0.000***	41.0 (2.9)	41.0 (2.4)	0.89	0.83
LDL (mg/dl)	106.1 (18.9)	96.4 (14.8)	0.002**	112.6 (18.1)	108.4 (16.9)	0.035*	0.015*
VLDL (mg/dl)	24.7 (13.7)	22.0 (8.7)	0.17	26.8 (11.7)	26.2 (10.9)	0.32	0.16
hs-CRP (μ g/ml)	2.9 (0.7)	2.2 (0.6)	0.003**	2.8 (0.8)	2.9 (0.6)	0.79	0.13
IL-6 (pg/ml)	1.9 (0.8)	1.3 (0.8)	0.000***	2.0 (0.9)	2.1 (0.9)	0.71	0.003**
TNF- α (pg/ml)	34.0 (13.8)	27.1 (11.7)	0.000***	35.2 (7.6)	36.9 (7.1)	0.15	0.001**

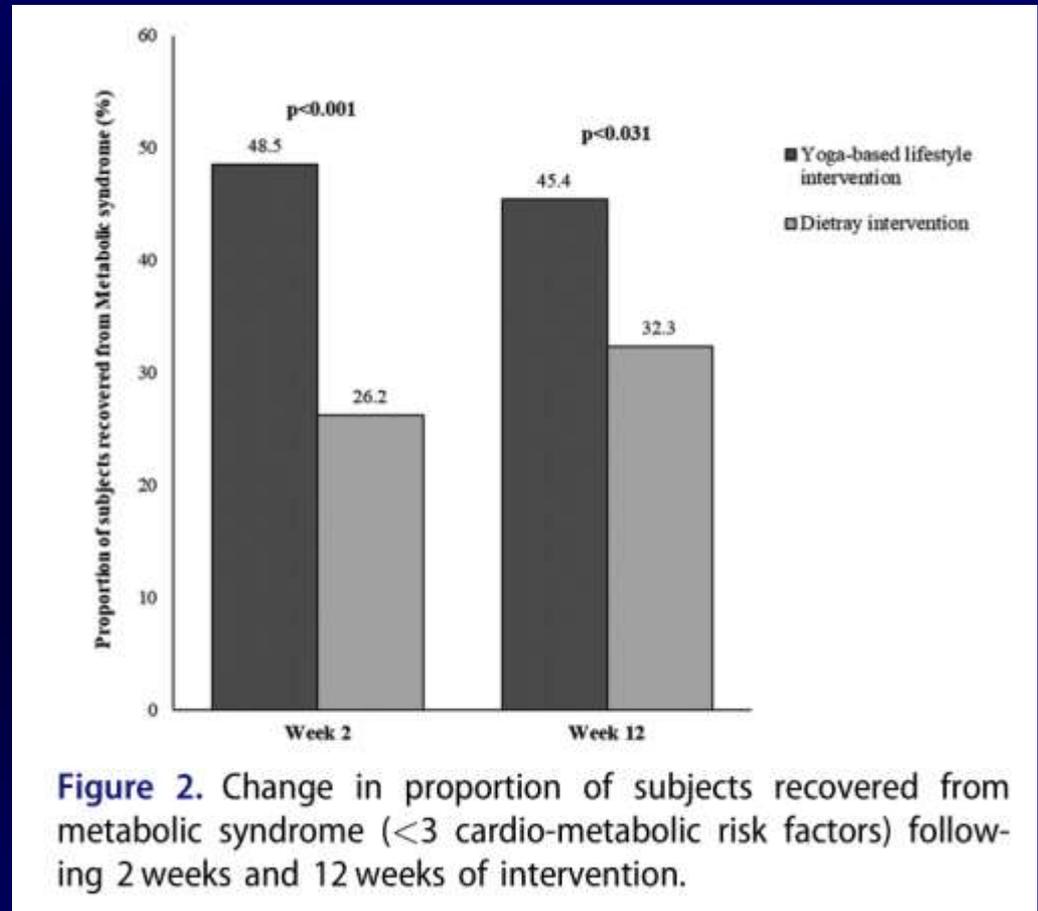
* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. HDL=High-density lipoprotein, LDL=Low-density lipoprotein, VLDL=Very low-density lipoprotein, hs-CRP=High-sensitivity C-reactive protein, IL-6=Interleukin-6, TNF=Tumor necrosis factor

From: *Effect of yoga training on inflammatory cytokines and C-reactive protein in employees of small-scale industries. Shete SU, Verma A, Kulkarni DD, Bhogal RS, Journal of Education and Health Promotion 9;6:76, 2017.*

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5561768/?report=printable>

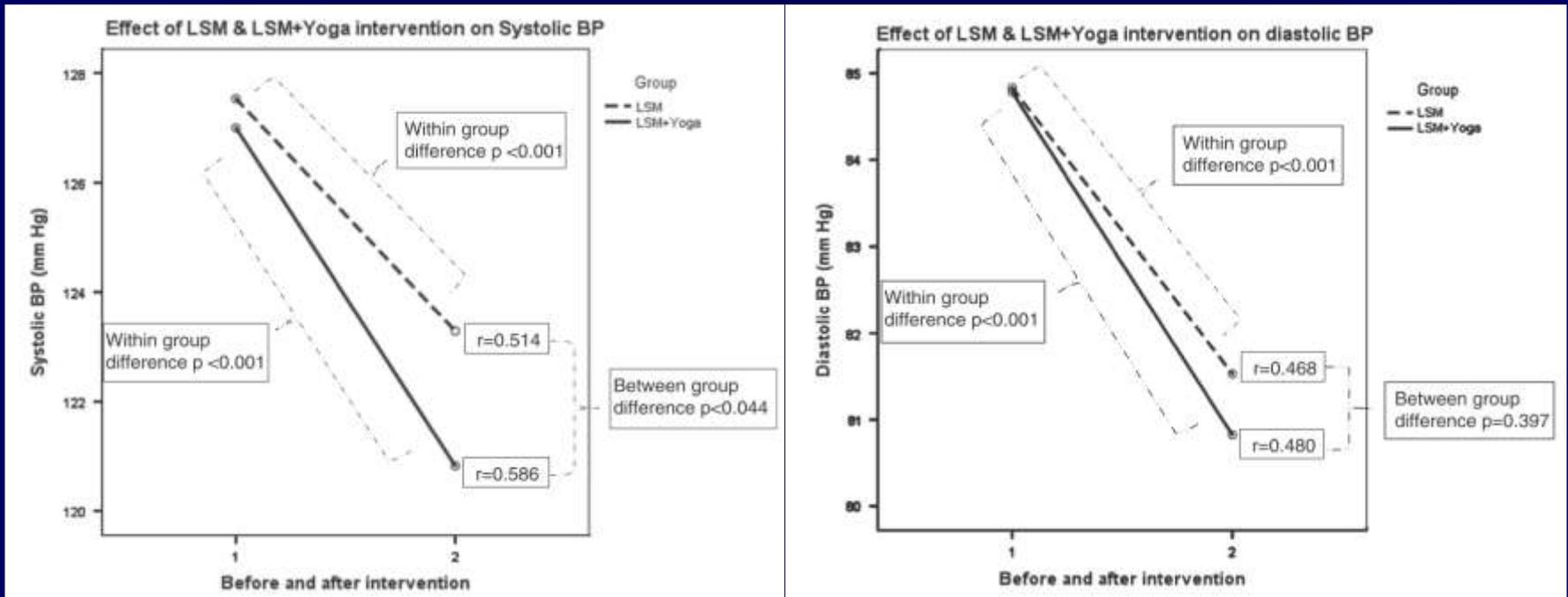
Yoga for Cardio-Metabolic Risk Factors

“Treatment X time interaction showed yoga-based lifestyle intervention had a greater treatment effect over dietary intervention by significantly reducing waist circumference, continuous metabolic syndrome z-score, and dietary intake/day while significantly increasing physical activity.”



From: *Randomized Controlled Trial of A 12-Week Yoga-Based (Including Diet) Lifestyle vs. Dietary Intervention on Cardio-Metabolic Risk Factors and Continuous Risk Score in Indian Adults with Metabolic Syndrome.* Yadav R, Yadav RK, Khadgawat R, Pandey RM, Upadhyay AD, Mehta N, *Behavioral Medicine* 46:9-20, 2020.

Yoga for CVD Risk Factors



From: *Additional benefit of yoga to standard lifestyle modification on blood pressure in prehypertensive subjects: a randomized controlled study.* Thiyagarajan R, Pal P, Pal GK, Subramanian SK, Trakroo M, Bobby Z, Das AK, *Hypertension Research* 38:48-55, 2015.

Yoga for CVD Risk Factors

“Compared to the control group, we observed significantly greater pre-post reductions in plasma [adrenomedullin] levels ($p < .001$), anxiety ($p < .002$), and sleep problems ($p < .003$) in both intervention groups. Furthermore, the YOMI group exclusively showed significantly greater pre-post reductions in stress ($p = .012$) and depression ($p = .021$) compared to the control group.”

“The five-week Yin yoga-based interventions appeared to reduce both the physiological and psychological risk factors known to be associated with NCDs.”

Table 2. Means and standard deviations (in parentheses) on study outcomes at two time points.

Variable	YOMI Group		Yin Yoga Group		Control Group	
	Pre	Post	Pre	Post	Pre	Post
ADM	6.11 (0.30)	5.96 (0.37)	5.83 (0.34)	5.70 (0.31)	5.86 (0.38)	6.16 (0.44)
Perceived stress	20.64 (5.87)	12.75 (4.93)	19.32 (5.69)	14.10 (8.28)	19.17 (6.21)	14.71 (6.60)
Anxiety	11.27 (3.61)	7.11 (3.70)	10.29 (3.66)	6.90 (4.34)	8.87 (4.13)	7.76 (4.02)
Depression	6.36 (3.33)	3.61 (2.85)	6.18 (2.90)	4.41 (3.63)	5.60 (3.27)	3.81 (3.09)
Insomnia	20.24 (5.90)	15.25 (6.36)	20.68 (6.21)	17.07 (7.02)	18.10 (6.68)	16.90 (5.69)

Note. ADM = adrenomedullin.

From: *Five-week yin yoga-based interventions decreased plasma adrenomedullin and increased psychological health in stressed adults: A randomized controlled trial.* Daukantaitė D, Tellhed U, Maddux RE, Svensson T, Melander O, PLoS One Jul 18;13(7):e0200518. 2018.

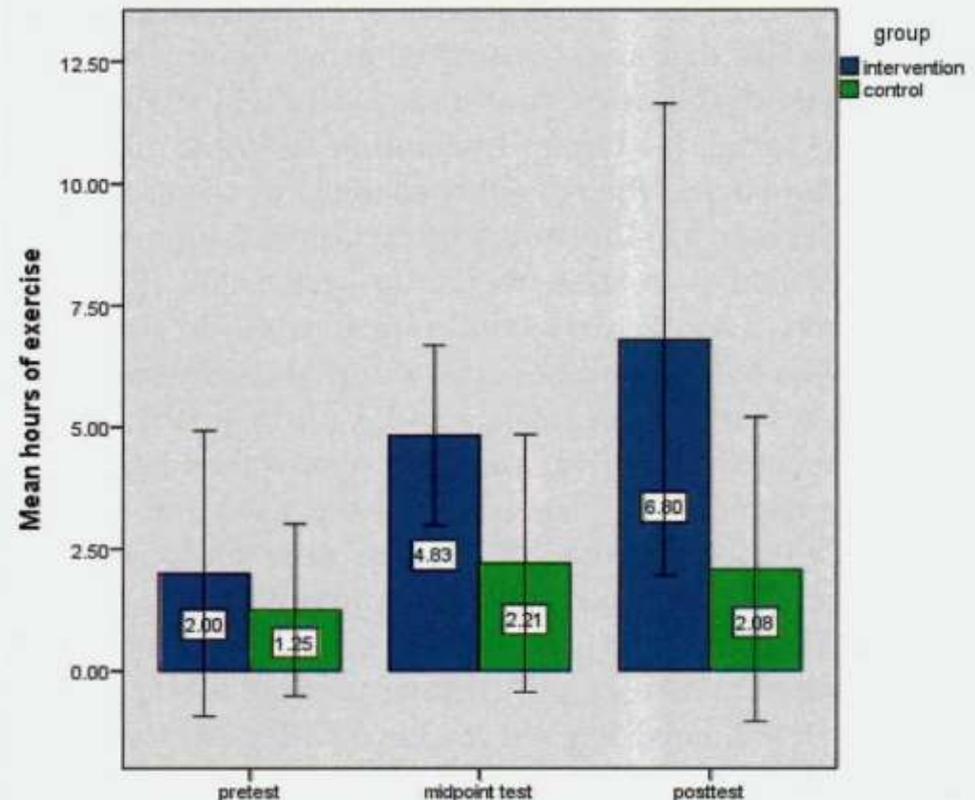
<https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0200518&type=printable>

Yoga for Exercise Adherence

“The acute-feeling responses to the yoga classes were favorable and may have been a key contributor to participants' improved perceptions of ability, which may have further fostered adherence.”

“The participants reported an increased self-awareness as a result of their experience.”

Figure 1. Exercise Adherence Data by Time and Group



From: The effects of yoga on psychosocial variables and exercise adherence: a randomized, controlled pilot study, Bryan S, Pinto Zipp G, Parasher R, Alternative Therapies in Health and Medicine, 18:50-9, 2012.



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Yoga Alliance® is committed to promoting and supporting the integrity and diversity of the teaching of yoga.





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Scientific Research on Yoga

Substantial research has been done on many of the populations and parts of the body that COVID-19 preys on most. Use this section of Yoga Alliance's website to learn more about scientific research on the effects of yoga on the **elderly**, **respiratory function**, **anxiety**, and **depression**, to name a few.

Perhaps more than ever, yoga is being widely studied and evaluated for its positive effects and benefits. At Yoga Alliance, we curate the latest and most relevant research on yoga's applications in health, wellness, and disease. We have filtered it in a digestible manner for our Registered Yoga Schools and Registered Yoga Teachers as well as for the broader yoga community.

This evidence-based research not only reveals the science of yoga, it also explains its therapeutic efficacy when used in conjunction with conventional medicine. Our goal is that this impactful content will be utilized in a way that highlights even more of yoga's ancient, multi-faceted ability to improve lives.

Join us! Let us know how research on yoga is important or valuable to you on social media (@YogaAlliance) or by emailing us at research@yogaalliance.org. We honor and value your personal experiences and look forward to featuring your stories.

Our Research Conversation

Our Director of Yoga Research



Our Director of Yoga Research Dr. Sat Bir Singh Khalsa is a renowned yoga research expert and yoga teacher who has committed his professional life to clinical research surrounding yoga's full spectrum of healing efficacy.

Learn More

Featured Research Video



Learn about the process of aging and how yoga affects (and even slows down) aging.

Watch Now

Featured Health News



Visit our COVID-19 website, YourYA.org, for the most recent and applicable information on the coronavirus and the COVID-19 pandemic.

Learn More

Main Research Categories



Basic Research



Special Populations



Disease and Disorders

Archived Videos

Browse our selection of **yoga research videos** to learn more about research done in specific categories of health and wellness.

Wellness and Disease Prevention

Disease Prevention, Disease Risk Factors, Health-Related Behaviors, Wellness, Quality of Life, Long-Term Practitioner Health

HOW TO READ THIS MATERIAL

Each citation is either:



A full-text article, or an abstract (summary) of a full-text article.



A Review Paper or Notable Publications.

Our hope is for yoga schools and yoga teachers to utilize this impactful content in their teachings to promote and highlight yoga's evident multi-faceted ability to improve lives. Let us know how research on yoga is important or valuable to you on social media (@YogaAlliance) or by emailing us at research@yogaalliance.org. We honor and value your personal experiences and look forward to featuring your stories.

These citations were curated by Yoga Alliance's Director of Yoga Research, **Dr. Sat Bir Singh Khalsa**.

Main Research Categories



Basic Research



Special Populations



Disease and Disorders

Review Papers [\(What's this?\)](#)

Role of Yoga in Cardiac Disease and Rehabilitation.

Guddeti RR, Dang G, Williams MA, Alla VM.
J Cardiopulm Rehabil Prev. 2019 May;39(3):146-152.
[\[full text \]](#)

Evidence Base of Yoga Studies on Cardiovascular Health: A Bibliometric Analysis.

Srihari Sharma KN, Choudhary NR, Subramanya P.
Int J Yoga. 2019 May-Aug;12(2):162-171.
[\[full text \]](#)

Harnessing the Four Elements for Mental Health.

Sarris J, de Manincor M, Hargraves F, Tsonis J.
Front Psychiatry. 2019 Apr 24;10:256.
[\[full text \]](#)

Disordered eating behaviours and correlates in yoga practitioners: a systematic review.

Domingues RB, Carmo C.
Eat Weight Disord. 2019 Apr 23.
[\[full text \]](#)

Notable Publications [\(What's this?\)](#)

Performing different kinds of physical exercise differentially attenuates the genetic effects on obesity measures: Evidence from 18,424 Taiwan Biobank participants.

Lin WY, Chan CC, Liu YL, Yang AC, Tsai SJ, Kuo PH.
PLoS Genet. 2019 Aug 1;15(8):e1008277.
[\[full text \]](#)

Greater Anteroposterior Default Mode Network Functional Connectivity in Long-Term Elderly Yoga Practitioners.

Santaella DF, Balardin JB, Afonso RF, Giorjani GM, Sato JR, Lacerda SS, Amaro E Jr, Lazar S, Kozasa EH.
Front Aging Neurosci. 2019 Jul 2;11:158.
[\[full text \]](#)

Understanding the physical activity needs and interests of inactive and active rural women: a cross-sectional study of barriers, opportunities, and intervention preferences.

Cadmus-Bertram LA, Gorzelitz JS, Dorn DC, Malecki KMC.
J Behav Med. 2019 Jun 13.
[\[full text \]](#)