



THE INTERNATIONAL ASSOCIATION OF YOGA THERAPISTS

Research Summary for Yoga Therapists: Yoga Therapy for Type 2 Diabetes Mellitus

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Research Summaries for Yoga Therapists are a service provided by IAYT to help yoga therapists navigate the twists and turns of the research landscape. The full reference can be found here:

Innes, K. E., Selfe, T. K., & Hecht, F. M. (2016). Yoga therapy for diabetes. In: S. B. S. Khalsa, L. Cohen, T. McCall, & S. Telles (Eds.). *The principles and practice of yoga in health care*. Pencaitland, United Kingdom: Handspring Publishing, 209–239.

What is the problem, and what is known about it so far?

Type 2 diabetes mellitus (T2DM) is characterized by hyperglycemia with insulin resistance and may include other complications, such as elevated blood pressure and chronic inflammation. As of 2011, an estimated 366 million people worldwide have T2DM, which reflects the adoption of Western lifestyles and a subsequent rise in obesity. T2DM increases the risk of co-occurring disease, such as diabetic neuropathy, retinopathy (vision loss), kidney disease, and stroke. Cardiovascular disease is the leading cause of death among those with T2DM. Although many risk factors, such as age and race, are associated with T2DM, the focus here is primarily on modifiable lifestyle risk factors, which include physical inactivity, poor sleep, depression, chronic stress, and smoking. Current treatment options critical for management of T2DM focus on reducing modifiable lifestyle risk factors in addition to safely reducing blood-glucose levels and other T2DM bio-indices.

Etiology and rationale for yoga

To date, mechanisms underlying T2DM are poorly understood. A few possible pathways might support yoga for T2DM.

- Yoga may reduce the downstream effects of stress, such as those on metabolic function and neuroendocrine status and inflammatory responses.
- Yoga may help modulate the autonomic nervous system (ANS) by stimulating the vagal system.
- Yoga may selectively activate areas of the brain associated with cognition and mood.

General methods

In this review, the authors focused on finding the best available primary research: randomized controlled trials (RCTs) and non-randomized controlled trials (NRCTs). Systematic reviews were excluded. A search for all available evidence was conducted to determine the effects of yoga in adults with T2DM. T1DM was excluded in this review.

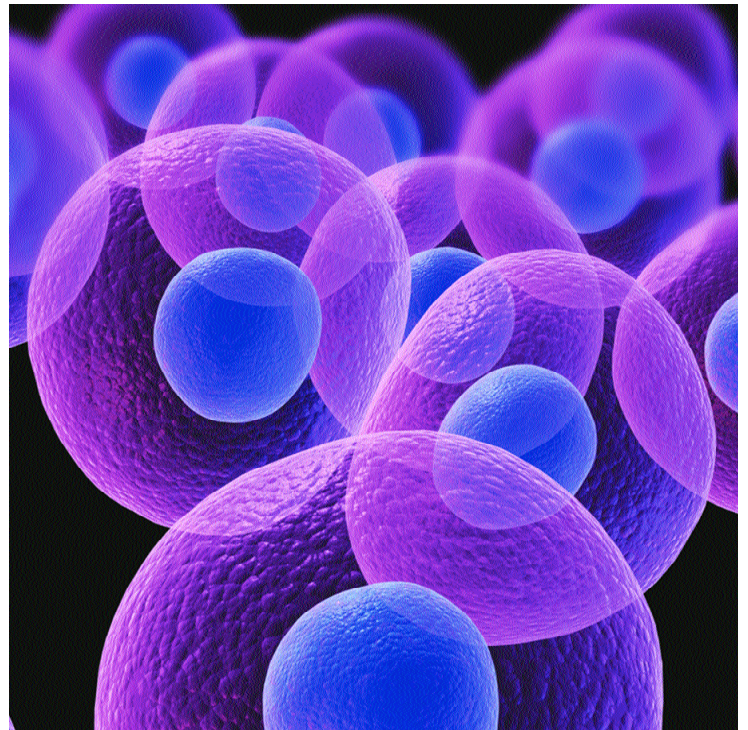
Who was studied?

All studies included T2DM adults with the exception of one, where the diagnosis was not clarified.

How were the studies conducted?

A total of twenty-three papers were identified, including twelve RCTs and eleven NRCTs. Most studies were conducted in India before the year 2000.

Central to T2DM management are physiological measures of glucose tolerance, insulin resistance, lipid profiles,



blood pressure, weight, and body composition. Other outcomes related to T2DM risk included oxidative stress, ANS dysfunction, mood, sleep impairment, and medication use.

The duration of the yoga interventions ranged from fifteen days to twelve months. Studies varied in practice frequency from one to two days a week to seven days a week. Twenty-one out of twenty-three studies included active asanas. Most of the yoga interventions were compared to waitlist controls, usual care, group education, or a comprehensive exercise program.

What did the researchers find?

- Twenty-two studies (twelve RCTs and ten NRCTs) measured glucose tolerance and insulin resistance and found clinically relevant and statistically significant improvements after yoga.
- Fifteen of sixteen trials (eight RCTs and eight NRCTs) that evaluated the effects of lipid profiles in adults with T2DM found significant improvements in lipid indices (e.g., serum cholesterol).
- Eight out of nine trials (three RCTs and six NRCTs) that evaluated the effects of yoga on weight and body composition found significantly beneficial effects.
- Five trials (two RCTs and three NRCTs) measured blood pressure in T2DM. Three of the five studies showed significant decreases in blood pressure in adults compared to usual care.
- Four trials (one RCT and three NRCTs) found improvements in measures of oxidative stress.
- Only two trials examined the effects on ANS regulation in T2DM, and they found beneficial effects.
- Secondary symptoms co-occurring with diabetes, such as sleep and mood disorders, were seldom studied. Three out of four studies (three RCTs and one NRCT) found beneficial outcomes for mood. Only one study (RCT) evaluated sleep in persons with diabetes, and that one found a significant improvement.
- Three trials (one RCT and two NRCTs) observed substantial reductions in medication use after the yoga program.

Were adverse events reported?

No adverse events were reported; this was likely due to poor reporting practices of the studies included in this review. Therefore, a safety assessment of yoga practices as administered cannot be determined.

What were the limitations and risks of bias?

To gain an appreciation for the results observed in the various studies showing benefits, one must evaluate the quality of the methods reported. In this review of best available evidence, as in much of the literature, the methodological quality of the included studies was poor. Sample size was small

among all studies. Of the twenty-three studies, only twelve were randomized, leading to the potential for selection bias. Of the twelve RCTs, only two reported details on the randomization process and took blinding into consideration. Therefore, there is limited confidence that steps were taken to minimize bias in the studies.

The studies also differed substantially in design, population, yoga intervention, frequency, and duration, making comparisons across other studies difficult.

Take-away message

Although the evidence to date supports improvement in relevant indices central to T2DM management, such as glycemic control, lipid levels, and weight and body composition, more studies with rigorous methodology and clear reporting standards are needed to confirm and elucidate the potential therapeutic benefits of yoga programs for adults with T2DM. However, yoga may promote clinically significant improvements and provide a low-cost alternative for T2DM management.

Clinical relevance of yoga for T2DM

Although both theoretical reasons and some experimental results suggest that yoga therapy can be a useful intervention for people with T2DM, methodological problems with most of the research to date prevent us from knowing this with greater certainty. Similarly, although well-designed yoga therapy interventions appear to be safe and well tolerated in this disease, less-than-ideal reporting of adverse effects in the studies limits the ability to draw conclusions. In addition to whatever benefits regular practice brings to the control of blood sugar, yoga appears to promote healthy behaviors and improvements in risk factors for common co-morbidities like improved functioning of the ANS, better blood pressure control, greater mindfulness of eating, and improved sleep. Yoga therapists therefore seem well justified in continuing their work with this population of patients, pending the results of better research. As research to date has not compared different approaches to each other for T2DM, it seems prudent for yoga teachers and therapists to choose yoga practices that their experience and training supports. Given the potential for injury in this patient population and considering the frequency of such diabetic complications as peripheral neuropathy, great attention to avoiding harm and awareness of potential contraindications should be stressed.