

Impact of a 10 minute Seated Yoga Practice in the Management of Diabetes

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Abstract

Objective: We sought to prospectively evaluate the impact of a 10 minute seated yoga program added to standard comprehensive diabetes care on glucose control and cardiovascular health in the severely ill, medically complex diabetic population.

Method: A total of 10 patients with type 2 diabetes, ages 49-77, with duration of diabetes >10 years and haemoglobin A1C >9% (75 mmol/mol) were included in the study. Patients randomized to a yoga intervention were taught a 10 minute seated yoga practice, were given an explanatory DVD and a fold-out pocket guide to encourage adherence at home, and were instructed to incorporate the practice as often as they could. The patients in the control arm were provided information and hand outs on the available yoga classes on campus.

Results: At 3 month clinical follow up, the mean decrease in fasting capillary blood glucose (CBG) was 45% among yoga participants (-5.2 ± 4.1 mmol/L). Heart rate (HR) dropped by 18% and Diastolic blood pressure (BP) dropped by 29% in the intervention arm, (-12.4 ± 6.69 and -26 ± 12.05 mmHg, respectively). There were no statistically significant changes in the haemoglobin A1C, systolic blood pressure, weight, or body mass index in either group.

Conclusion: Our small pilot study reinforces the current medical evidence supporting the use of yoga, combined with standard care, to improve health outcomes in diabetes.

Keywords: Yoga; Diabetes; Stress reduction; Glycaemic control; Hypertension; Heart rate; Cardiovascular health

Introduction

The practice of yoga is well established as a mind-body exercise that improves overall health and promotes stress reduction. Previous studies of yoga in patients with type 2 diabetes have shown improvement in glucose control, but a significant limitation of these studies is the nature of the yoga intervention itself [1,2]. The majority of the trials evaluating the benefits of yoga involve vigorous posture-based practices (asana) and/or yogic breath exercises (pranayama) not feasible for most of those who are severely ill or with complex disease processes. Furthermore, many traditional exercise regimens, even low impact walking or swimming, remain out of reach for the patients who are wheelchair bound or otherwise physically unable [3].

The American Diabetes Association recommends not only traditional medical intervention but also advocates counselling on healthy lifestyle modification and stress reduction as a part of comprehensive diabetes care. Few exercise and stress reduction regimen are designed specifically for the elderly, severely ill, diabetic population, and even fewer have been evaluated prospectively in the medical literature [4].

Materials and Method

As part of our patient-centred care initiative, a 10-minute seated yoga program was developed that would be manageable to all Veterans. The seated program was designed to include participants of all physical abilities [5]. The entire sequence included 5 postures coupled with deep breathing to allow for increased mind-body awareness in the participant. Each posture was taught with appropriate modifications for participants of varying abilities. The entire sequence took 10 minutes to complete.

We prospectively evaluated the impact of this intervention,

added to our program of comprehensive diabetes care for patients with complicated or difficult to manage diabetes, on glucose control and cardiovascular health. We consented a total of 10 patients with type 2 diabetes, ages 49-77, with duration of diabetes >10 years and haemoglobin A1C >9% (75 mmol/mol). Patients were randomized to a yoga intervention or control group; the patients in the yoga arm were taught the 10 minute seated yoga practice, were given an explanatory DVD and a fold-out pocket guide to encourage adherence at home, and were instructed to incorporate the practice as often as they could. The patients in the control arm were provided information and hand-outs on the available yoga classes on campus (Figure 1).

Results

There were no statistically significant differences in the baseline characteristics in either group including age, weight, BMI, medications prescribed, insulin use, and micro vascular or macro vascular complications; 60% of the patients had identified coronary artery disease and 80% of the patients had chronic kidney disease. All patients were using basal insulin with 70% also using prandial insulin (Table 1).

At 3 month clinical follow up, the participants in the yoga

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	Control (mean ± SD)	Intervention (mean ± SD)	p-value
Age (years)	60 ± 10.34	68.8 ± 5.97	0.14
Duration of Diabetes (years)	13.6 ± 6.8	18 ± 5.48	0.29
	Control, n (%)	Intervention, n (%)	
Men	5 (100%)	4 (80%)	0.37
History of CAD	3 (60%)	3 (60%)	1
History of CKD	4(80%)	4(80%)	1
	Stage 2: 2 (40%)	Stage 2: 1 (20%)	0.54
	Stage 3: 1 (20%)	Stage 3: 3 (60%)	0.58
	Stage 4: 0 (0%)	Stage 4: 0 (0%)	1
	Stage 5: 1 (20%)	Stage 5: 0 (0%)	0.35
Diabetic Medications:			
Oral Hypoglycemic Agents	2 (40%)	1 (20%)	0.54
Metformin	2 (40%)	2 (40%)	1
Basal Insulin	5 (100%)	5 (100%)	1
Prandial Insulin	3 (60%)	4 (80%)	0.54
Other	1 (20%)	0 (0%)	0.34
Medications:			
Statin Use	4 (80%)	4 (80%)	1
ACE-I/ARB	5 (100%)	5 (100%)	1
Beta-blocker	4 (80%)	4 (80%)	1

Table 1: Baseline characteristics (n=10).

	Control Group (n=5)			Intervention Group (n=5)		
	Pre	Post	p-value	Pre	Post	p-value
Fasting CBG (mmol/L)	15.2 ± 6.4	12.7 ± 2.9	NS	11.5 ± 3.7	6.4 ± 1.0	0.048
HbA1c (%)	10.74 ± 3.36	10.79 ± 1.80	NS	9.72 ± 2.76	8.92 ± 1.42	NS
HbA1c (mmol/mol)	93 ± 36.7	95 ± 19.7	NS	83 ± 30.2	74 ± 15.5	NS
HR	77.8 ± 10.26	86.2 ± 14.18	NS	83 ± 11.22	70.6 ± 8.84	0.01
Systolic BP (mmHg)	133.8 ± 12.27	140 ± 13	NS	137.6 ± 14.25	132.4 ± 10.67	NS
Diastolic BP (mmHg)	86.4 ± 9.42	86.4 ± 8.29	NS	89.8 ± 10.66	63.8 ± 9.12	0.02
Weight (lb)	101.97 ± 20.53	105.05 ± 18.42	NS	97.61 ± 17.50	97.07 ± 17.88	NS
BMI (kg/m ²)	32.38 ± 6.84	33.70 ± 6.11	NS	31.44 ± 3.48	31.29 ± 3.70	NS

Table 2: Results are expressed as mean ± SD.

- From neutral, left hand to left waist.
- **INHALE:** raise right arm overhead.
- **EXHALE:** bend left without collapsing forward into a twist.
- **INHALE:** lengthen back to upright.
- **EXHALE:** lower right hand to right thigh.
- Repeat.
- Switch sides.




Figure 1: Sample.

intervention arm showed significant improvements in fasting capillary blood glucose (CBG), heart rate (HR), and diastolic blood pressure (DBP), compared to the control arm. The mean decrease in fasting CBG was 45% among yoga participants (-5.2 ± 4.1 mmol/L). HR dropped by 18% and Diastolic BP dropped by 29% in the intervention arm, (-12.4

± 6.69 and -26 ± 12.05 mmHg, respectively). There were no statistically significant changes in the haemoglobin A1c, systolic blood pressure, weight, or body mass index in either group. There were no reported adverse events in either group (Table 2).

Discussion

Our pilot study reinforces the current medical evidence supporting the use of yoga, combined with standard care, to improve health outcomes in diabetes. Ours is the first report to show significant health benefits of yoga among Veterans with poorly controlled diabetes. The simplicity and accessibility of this yoga program makes it very useful and applicable to the general population. The yoga intervention was easily incorporated into the patients' daily routines, and the impact was similar to recently reported cardiovascular benefits from modest exercise [6].

The positive data from this small pilot study supports the integration and evaluation of mind-body stress reduction techniques in the elderly, ill diabetic population on a larger scale. This population, with hemoglobin A1c greater than 9, often fails standard medical treatments and requires additional patient-centered interventions such as health coaching to encourage adherence and coping with chronic illness [7]. Many of these patients are able to achieve short-term improvements in glycaemic control with one-on-one attention, but after a few months,

they are unable to maintain these achievements in the absence of that individualized interaction. The addition of our seated yoga program provides a sustainable form of stress reduction and exercise that allows patients to improve mind-body awareness. Previous studies have shown that patients with strong mind-body connections have improved cardiovascular risk profiles, which is the ultimate goal for comprehensive diabetes care [8].

Our study supports the current available literature and has clearly shown that both blood pressure and fasting blood sugar were significantly improved after 3 months of seated yoga. This confirms that even modest enhancements in stress reduction and coping are associated with large improvements in metabolic health. While there was a trend towards improvement in haemoglobin A1c, it is possible that a larger effect was not seen since the study did not target diet and post-prandial blood sugar.

It is interesting to note the effect our program had on the weight of patients in both the control and intervention arms. While not statistically significant, there was a clear trend towards weight gain in the control group. One of the primary complaints of patients with longstanding diabetes is difficulty with weight loss. After years of physical inactivity, diet and medication adherence become the mainstay of glycaemic control for these patients. Those who are subsequently compliant with medication and insulin regimens often discover that improved glycaemic control without exercise or dietary modification can result in additional weight gain. Many of these patients become dejected and hopeless about their diabetes care further adding to stress and compliance issues. Our 10 minute yoga intervention helps to break this vicious cycle. Participants in the intervention group not only saw improved glycaemic and blood pressure targets, there was no significant weight gain, whereas there was a trend towards increased weight in the control arm.

The primary limitation of our study was the small sample size of the pilot. Our data clearly warrants further investigation on a larger scale. Longer follow up after the completion of the yoga intervention will

determine if patients are truly able to incorporate this stress reduction technique daily as a part of long-term health. Ours is one of very few programs that specifically evaluated a stress reduction and exercise program in the very ill diabetic population. We have successfully shown that a combination of traditional medical care integrated with a mind-body exercise technique may be the best approach to tackle the complexities in achieving improved glycaemic control for this population.

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