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Research Article

Addressing Psychosocial Stress in Veterans with Diabetes-related Vascular Complications: A pilot study

Rashmi Mullur[1,3]*, David Aungst[1,2], Jonathan Thompson[1,2], Jessica Jaswal[1,2], Jessica O'Connell[1,2] and Aksone Nouvong[1,2]

[1]*Greater Los Angeles Veterans Affairs Healthcare System, USA*

[2]*Department of Surgery, David Geffen School of Medicine, Los Angeles, California, USA*

[3]*Department of Medicine, David Geffen School of Medicine, Los Angeles, California, USA*

Abstract

Background & Hypothesis: Patients with Type 2 Diabetes Mellitus (DM2) can struggle with diabetes-related distress, depression and anxiety which can worsen glycemic control. Additionally, in patients with comorbid vascular complications and diabetes, limited mobility can make participation in traditional exercise and movement-based programs extremely challenging. Given that sedentary lifestyles and psychosocial stress contribute to hyperglycemia, we recognized a need to address psychosocial stress using mind-body and expressive arts therapies which have previously been shown to improve well-being in patients with chronic disease. To evaluate the benefits of integrative stress-reduction approaches in Veterans with diabetes and vascular disease, we created a pilot program focused on examining the efficacy of journaling combined with positive insights on glycemic control.

Methods: Participants enrolled in the active arm received positive insight cards, a bound journal for reflection, and were instructed to journal after reviewing the cards. Participants in the control group did not receive insight cards or a journal. All interested participants were also provided information about mind-body based CIH approaches available at the Greater Los Angeles VA. The study endpoints include the following: improved blood pressure (decreased), higher water content and lower body fat (as measured by the bioimpedance machine), and improved HbA1C results. All subjects also completed two surveys: the Patient Health Questionairre-9 (PHQ-9) and the Cohen Perceived Stress Scale (PSS) which are two validated measures of depression risk, overall well-being and stress, respectively.

Results: Hemoglobin A1c, BP, Vital Signs, and BMI remained unchanged in either group. Overall, there was no improvement in any primary or secondary outcomes. Of note, for participants with Veterans with an A1c > 9%, there appeared to be a baseline difference between the groups, with the intervention arm showing higher A1c, higher PHQ-9, and higher perceived stress scores and a larger improvement in A1c at the end of the intervention.

Conclusion: While our pilot study evaluating the impact of journaling and expressive arts therapies did not reveal an improvement in glycemic outcomes, we believe that for patients with evidence of depression and/or diabetes-related distress, our study still highlights the importance of addressing psychosocial stress in clinical care and the need for further clinical studies.

Keywords: Expressive arts therapies; Depression; Diabetes-related distress; Diabetes-related Vascular Complications; Psychosocial Stress; Veterans

***Corresponding author:** Rashmi Mullur, Department of Medicine, Greater Los Angeles Veterans Affairs Healthcare System and David Geffen School of Medicine, Los Angeles, California, USA, E-mail: RMullur@mednet.ucla.edu

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Background & Introduction

Type 2 Diabetes mellitus (DM2) affects 37 million people living in the United States [1] and nearly 25% of all veterans enrolled in Veterans Health Administration (VHA) services carry a diagnosis of diabetes [2]. It is established that maintaining blood glucose at, or near, goal levels reduces the risk of diabetes-related complications [3]. Vascular diseases are the principal cause of death and disability in patients with diabetes [4] and Veterans with DM2 are more likely to be inflicted with severe Peripheral Arterial Disease (PAD) [5]. The clinical manifestations of PAD make traditional exercise and movement-based programs extremely challenging, and treatments for vascular conditions often highlight the role of stress-management in mitigating symptoms [6]. Additionally, patients with diabetes are often predisposed to emotional distress, with depression, anxiety, and stress affecting around 20-40% of the population [7]. Given that sedentary lifestyles and psychosocial stress contribute to hyperglycemia [8], this vulnerable patient population with diabetes-related vascular disease often struggle with worsening comorbidities due to chronic stress [9]. This highlights the need to address psychosocial stress to improve the care and management of this vulnerable, Veteran patient population.

In the early 2000s, the Veterans Healthcare Administration (VHA) began to offer complementary and integrative health (CIH) approaches to address the multimodal needs of Veterans struggling with post-traumatic stress disorder (PTSD) and chronic pain [10]. At the Greater Los Angeles Veterans Affairs (GLA VA) we offered a wide range of CIH approaches including yoga, tai chi, meditation/mindfulness, acupuncture and other therapies such as dance and the expressive arts by the early 2010s. Early pilot studies from our facility demonstrated the benefit of mind-body and expressive arts

therapies in Veterans with chronic diseases [11] and severe mental illness [12]. Journaling on positive memories and gratitude-based practices, including mindful self-compassion have previously been shown to positively impact mental health and well-being in Veterans [13,14]. While PTSD and chronic pain are prevalent in the Veterans population, many also struggle with chronic metabolic diseases that results in significant cardiovascular co-morbidity. A survey of CIH services throughout VHA revealed that 89% of facilities offered some form of CIH, including Mindfulness-based stress reduction, yoga, tai-chi, and acupuncture [15].

To evaluate the benefits of integrative stress-reduction approaches in Veterans with diabetes and vascular disease, we created a pilot program focused on examining the efficacy of journaling combined with positive insights. We aim to demonstrate that insights prompted Veterans to examine their own health goals and priorities while helping them better manage their stressors.

Methods

Following IRB approval, subjects, age 18-79, were recruited from the limb-preservation clinic at the VA-Greater Los Angeles. The population was not limited by gender or racial/ethnic group and demographic information was recorded with the subjects' consent. Inclusion criteria for this study consisted of a formal diagnosis of diabetes by standard lab parameters and a glycated hemoglobin test (HbA1C) within the last three months.

In addition to HbA1c, blood pressure and body composition was measured at the first three (out of four total) office visits. Blood pressure was measured with a standard cuff monitor. Body composition was measured using bioelectrical impedance analysis (BIA) through a machine, which is a commonly used method for measuring the body fat, water, and muscle content of a patient. Higher body fat and lower water content percentages are typical indications of a body responding to excess stress, making BIA a valuable measurement of the effects of stress in a subject's overall health [16]. The bioimpedance machine used in this study is FDA-approved and classified as a non-significant risk machine. This machine has few contraindications; these consist of subjects with pacemakers or implanted defibrillators, subjects with seizure disorders, and subjects who are or may be pregnant; these contraindications have been included as exclusion criteria for this study.

All subjects also completed two surveys: the Patient Health Questionairre-9 (PHQ-9) and the Cohen Perceived Stress Scale (PSS) which are two validated measures of depression risk, overall well-being and stress, respectively.

Subjects enrolled in the active arm received positive insight cards highlighting psychosocial factors that impact health, a bound journal for reflection, and were instructed to review the cards and participate in journalling as often as they felt inclined. Participants in the control group did not receive insight cards or a journal. All interested participants were also provided information about mind-body based CIH approaches available at the Greater Los Angeles VA.

The study endpoints include the following: improved blood pressure (decreased), higher water content and lower body fat (as measured by the bioimpedance machine), and improved HbA1C results.

When analyzing the data, subjects were matched (using age, HbA1c, and gender) to reduce variance and effectively power the sample size using paired difference techniques.

Results

Table 1 highlights the patient characteristics and demographics. There were no statistically significant differences between the control and intervention groups.

Table 2 reports the data from our pilot study. Hemoglobin A1c, BP, Vital Signs, and BMI remained unchanged in either group. There was no difference in PHQ-9 or PSS in either group. The Bioimpedence data (not shown) was also unchanged in either group. Overall, there was no improvement in any primary or secondary outcomes.

Of note, for Veterans with an A1c > 9%, (Table 3) it is evident that there is a baseline difference between the groups, with the intervention arm showing higher A1c, higher PHQ-9, and higher perceived stress scores and a larger improvement in A1c at the end of the intervention.

Patient Demographics	Control (n=17)	Intervention (n=19)	Total (n=36)	
Mean age - yr	63.8 ± 9.3	63.7 ± 7.5	63.8 ± 8.3	
Male sex - no. (%)	17 (100)	18 (95)	35 (97)	
Race & Ethnicity - no. (%)				
African American, Non-Hispanic or Latino	3 (17.6)	10 (52.6)	13	(36.1)
White, Non-Hispanic or Latino	8 (47.1)	4 (21.1)	12	(33.3)
White, Hispanic or Latino	4 (23.5)	4 (21.1)	8	(22.2)
Unknown, Unknown	2 (11.8)	1 (5.3)	3	(8.3)

Table 1: Patient characteristics at baseline by treatment group.

		Control (n=17)		Intervention (n=19)	
			Change from	Change from	
Variable	Visit	Mean ± SD	baseline	Mean ± SD	baseline
HbA1C	Baseline (day 0)	8.0 ± 1.4		8.6 ± 2.4	
	3-month Follow-up	7.7 ± 1.3	-0.3	7.9 ± 1.9	-0.7
BMI	Baseline (day 0)	32.6 ± 5.8		34.9 ± 8.1	
	15-day Follow-up	32.2 ± 5.6	-0.4	35.5 ± 9.3	0.7
	30-day Follow-up	32.2 ± 5.7	-0.4	35.8 ± 9.6	1.0
	3-month Follow-up	31.8 ± 5.9	-0.8	35.5 ± 9.3	0.6
PHQ-9 score	Baseline (day 0)	5.8 ± 5.8		7.2 ± 4.6	
	15-day Follow-up	6.4 ± 5.8	0.6	5.8 ± 4.6	-1.4
	30-day Follow-up	5.4 ± 5.5	-0.4	7.1 ± 5.3	-0.1
	3-month Follow-up	6.0 ± 5.4	0.2	7.5 ± 4.3	0.3
Perceived Stress					
score	Baseline (day 0)	11.9 ± 7.0		12.3 ± 5.0	

	15-day Follow-up	12.4 ± 5.4	0.4	13.7 ± 5.8	1.4
	30-day Follow-up	10.0 ± 6.6	-1.9	13.5 ± 6.4	1.2
	3-month Follow-up	11.0 ± 6.6	-0.9	11.5 ± 4.9	-0.8

Table 2: Mean and change from baseline of key variables, including hemoglobin A1C (HbA1c), body mass index (BMI), Patient Health Questionnaire-9 (PHQ-9) score, and the Perceived Stress score, by treatment group and visit.

		Control (n=4)		Intervention (n=6)	
		Mean ± SD	Change from	Mean ± SD	Change from
Variable	Visit		baseline		baseline
Hemoglobin A1C	Baseline	9.8 ± 0.7		11.6 ± 1.8	
	3-month Follow-up	9.4 ± 1.3	-0.43	9.3 ± 2.9	-2.28
BMI	Baseline (day 0)	33 ± 4.5		35.8 ± 9.2	
	15-day Follow-up	32.7 ± 5.2	-0.36	36.1 ± 8.8	0.35
	30-day Follow-up	32.6 ± 5	-0.47	35.9 ± 9	0.09
	3-month Follow-up	31.9 ± 5.5	-1.12	35.7 ± 9.2	-0.12
PHQ-9 score	Baseline (day 0)	3.3 ± 3.4		6.8 ± 4.7	
	15-day Follow-up	4.5 ± 4.4	1.25	5.5 ± 3.9	-1.33
	30-day Follow-up	3.3 ± 2.6	0.00	5.7 ± 4.8	-1.17
	3-month Follow-up	4.8 ± 4.2	1.50	5.5 ± 4.5	-1.33
Perceived Stress score	Baseline (day 0)	8±4.5		13.7 ± 5.3	
	15-day Follow-up	11 ± 6.1	3.00	16.2 ± 6.1	2.50
	30-day Follow-up	10.8 ± 5.8	2.75	16.5 ± 4.4	2.83
	3-month Follow-up	10.3 ± 2.6	2.25	10.7 ± 3.8	-3.00

Table 3: Mean and change from baseline of key variables, including hemoglobin A1C (HbA1c), body mass index (BMI), Patient Health Questionnaire-9 (PHQ-9) score, and the Perceived Stress score, by treatment group and visit, only among patients with hemoglobin A1C ≥ 9.0 at baseline.

Discussion

Our pilot study did not demonstrate any clinically significant improvements in glycemic based outcomes. We acknowledge that our study has several limitations. Most notably, in recruiting patients, it is now clear that for patients with diabetes and cardiovascular morbidity, assessment of diabetes-related distress in addition to PHQ-9 and PSS would be of benefit as prior studies have shown that mind-body approaches are most effective for patients with diabetes-related distress [17]. Furthermore, we suspect that in the subgroup of participants with A1c > 9%, the impact of our journaling-based intervention was more successful due to the impact of diabetes-related distress, which is often associated with poor glycemic control [18]. Finally, , our pilot study did not track how often patients reviewed the positive insight cards and engaged in journaling.

Previous pilot studies have demonstrated the benefit of mind-body approaches in clinical care[3], but it is important to recognize that implementation of mind-body and holistic approaches for patients struggling with chronic disease requires additional support for sustained improvement in health outcomes. Currently, there is evidence that supports the use of these approaches in chronic disease management, including hypertension [19] and diabetes [20], but we must acknowledge that for patients with severe comorbidity, access can be limited due to chronic disability. As the use of mind-body approaches gain wider acceptance in clinical care, we must take efforts to ensure that these options are accessible. This offers a new opportunity to incorporate assessment of psychosocial stress into clinical care and offer reasonable and accessible telehealth based CIH approaches for Veterans with chronic disease and disability.

Our pilot study could be ignored as a "failure" of journaling and expressive arts therapies in integrative care for Veterans with diabetes and cardiovascular co-morbidity. However, we believe that our "negative" pilot study still highlights the importance of addressing psychosocial stress in clinical care and the need for further clinical studies. Since the time of our small pilot study, the VHA has implemented the Whole Health (WH) program as a clinical transformation in care. This clinical model shifts the focus of the clinical encounter to ask the Veteran, "What Matters to you?" In this model, the Veteran can prioritize both their psychosocial needs in addition to their medical care goals. The VA has shown that this model of holistic mind-body-spirit care improves Veteran well-being, engagement in health services and decreases the need for opioid medications [21], and is also successfully delivered virtually [22]. Prior to the transformation to WH, our study demonstrated that for Veterans with chronic disease and disability, offering an outlet to address psychosocial stress and resilience-building skills through journaling can improve health outcomes for a vulnerable Veterans population.

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