

**An Interdisciplinary Approach to Therapeutic Copings for Diabetes With Meditation And
Mindfulness Interventions**

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Abstract

The discovery of insulin over 100 years ago in 1921 instilled hope in diabetic patients that their disease may someday be cured. This dream has yet to come to fruition, however science has made great strides in the treatments and management of the disease. Historically, scientists have focused on medications and technology to treat and monitor diabetes (Lakhtakia, 2013). It is a chronic illness that targets the body and impacts the brain. Treatments should shift their focus on healing starting in the brain. The brain is a powerful machine that has the potential to assist in treatments from the inside. One way to unlock this power is through meditation. This is an intrinsic way to calm the body and combat issues that present themselves in various forms. This literature-based report analyzes the efficacy of meditation and mindfulness on common complications in patients with diabetes such as high blood glucose, hypertension, and coping with diabetic guilt.

Diabetes is a metabolic disorder that presents itself in one of two types; type one occurs when the body stops making insulin completely, and type two increases the body's resistance to it, as well as limiting the naturally occurring supply. With either type, medical intervention is necessary to prevent life-threatening conditions. Insulin is a peptide hormone created by the body to control blood glucose levels. Type one treatment involves a biosynthetic human insulin is injected subcutaneously in order to control blood glucose levels. A treatment for type two diabetes stimulates the pancreas to produce more insulin. The most important aspect of this, regardless of which type, is to keep blood glucose in a normal range. Blood glucose staying in extremes for too long is detrimental. Hypoglycemia must be treated immediately by increasing glucose through oral methods or intravenously (Peters, 2006). However, low blood glucose is not

the root of long-term complications, so efforts are focused on keeping blood glucose from getting dangerously high. Complications from high blood glucose target both the micro and macro vasculature. For large blood vessel health, it is of the utmost importance to treat underlying risk factors for heart disease especially hypertension. Maintenance of these blood glucose and blood pressure lessens cardiovascular implications including coronary artery disease, stroke, and heart attack. Small blood vessel damage in the eyes, nerves, and kidneys is primarily caused by elevated blood glucose (Sinha et al, 2018). The foundations of diabetes have been established, the emphasis is shifted to the topic of meditative practice in order to enhance diabetic treatments for better disease and improved quality of life.

Discussion

Blood Glucose

The primary complication of diabetes is elevated blood glucose levels. Common treatments for this factor are medication and a healthy lifestyle that includes managing diet and exercise (Peters, 2006). The addition of meditative practices to this regimen has proven itself beneficial to the reduction and management of blood glucose levels. In a stressed state, the body's parasympathetic nervous system activates and ensures that enough glucose and energy are available, thus lowering insulin uptake and production. Meditation reduces the release of hormones that induce the stress response, like cortisol. Cortisol causes high blood glucose by releasing glucose storage in the liver. Over time, the cortisol stimulates the production of glucose, causing blood glucose to rise (Bock et al, 2019).

The gold-standard of assessing long-term blood glucose control in diabetics is measuring glycosylated hemoglobin levels (HbA1C). This test is administered ideally every three months. It

measures the amount of glucose attached to red blood cells (hemoglobin). Blood cells have a lifespan of three months—hence the three-month period between tests. Simply, this means that it is an average of the last three months of everyday blood glucose as a measure of how well it is being managed. Reductions in this indicate long-term improvement of blood glucose management. Non-diabetic HbA1C levels are below 6%, while diabetic patients aim to achieve a level under 7%. Levels can get as high as 14% in patients with uncontrolled blood glucose (Peters 2006). Any statistically significant decrease in HbA1C improves disease management.

A 2019 study compared the effects of a 12-week program of either Iyengar yoga or a standard exercise program on acceptability in diabetic patients. Iyengar yoga focuses on alignment and breath control and is deemed accessible for all body types. Results indicated that the vast majority of subjects had high attendance rates at 82% as well as a satisfactory experience in both programs, though the yoga produced slightly higher rates. HbA1C levels were only reduced in the yoga program. Yoga triggered a statistically significant reduction of HbA1C by a median of 1.25 units lower than that of the standard exercise program (Bock et al, 2019). An additional study evaluated the effects of six months of meditation practice on specifically blood glucose levels. These subjects were all diagnosed with coronary artery disease—a common comorbidity in the diabetic community. The group that practiced meditation had a significant reduction in HbA1c levels. The average dropped from 5.8% to 5.6%. Postprandial (after eating) and fasting blood glucose both had additional significant reductions (Sinha et al, 2018).

Dr. Carla Miller's meta-analysis study "Mindful eating with diabetes" explores the interactions between mindfulness meditation, diet, and blood glucose levels (Miller, 2017). Eating habits are the primary lifestyle area that diabetes affects, the sugars in the foods consumed are broken down and make their way to the blood—causing blood glucose levels to rise.

Carbohydrates are the primary source of sugar in the blood. High-carbohydrate foods are notoriously bad for diabetics; both simple and complex carbohydrates increase blood glucose levels. This occurs because the body breaks down these carbs into glucose, which enters the bloodstream and causes blood sugar to rise (Walsh, 2016). High carb counts and overeating are undesirable diet habits for diabetic patients. Researchers evaluated 6 studies that involved mindfulness-based eating awareness training. This training aims at creating a conscious awareness of habits and attention to sensation, thoughts, and emotions. Miniature meditations are encouraged before eating to bring awareness to the present moment. They focus on the fact that taste buds decrease their sensitivity to taste after a small amount of food. Participants become aware when satisfaction from a specific food decreases so as to maximize pleasure with smaller portions. This resulted in a HbA1C reduction of 0.83 units three months post training. This was a reduction of blood glucose by targeting eating habits primarily through meditative practices (Miller, 2017).

Meditation should be implemented in conjunction with additional high blood glucose treatments due to its ability to decrease glucose levels in the long-term, as seen with the reduction of the measurements of glycosylated hemoglobin. This is a safe and effective treatment that positively impacts hyperglycemia—a factor that causes significant damage.

Blood Pressure

The comorbidity of high blood pressure in patients with diabetes can significantly raise the risk of heart attacks and strokes (Anderson et al, 2007). Therefore, it is especially important to treat high blood pressure and keep it within a normal range as much as possible. Even though there are medications that reduce blood pressure, controlling a contributing factor like stress

makes medication therapy more effective or unnecessary. Studies have found that chronic stress may be an important leading factor to hypertension (Bhasin et al, 2018).

Several practices that help calm the mind also lower blood pressure. All are types of meditation that evoke the relaxation response, which is the opposite of the fight-or-flight response that people experience during stressful scenarios. Meditation can trigger the relaxation response. Meditation quiets the brain, consequently decreasing the body's response to stress. Meditation techniques appear to produce a smaller reduction in blood pressure. Transcendental meditation and mindfulness-based stress reduction therapy, however, produce clinically significant reductions in both systolic blood pressure and diastolic blood pressure. Meditation increases the production of nitric oxide, a compound that widens the arteries, causing more efficient movement of blood and systemically lowering blood pressure (Martin, 2008).

A meta-analysis of nine studies concluded that transcendental meditation reduced both diastolic and systolic blood pressure by an average of 4.7 mmHg and 3.2 mmHg respectively (Anderson et al, 2007). Transcendental meditation involves the repeating of mantras to oneself and focusing on breathing for 15 to 20 minutes. What is unique about transcendental meditation is that it emphasizes the connection to consciousness, not a higher power, it aims at awareness of the body. Although the relationship is relatively unknown, transcendental meditation increases telomere length, this then causes a decrease in blood pressure due to better genetic expression.

The relaxation response is a byproduct of meditation that occurs when no more danger has been perceived and the autonomic nervous system returns to its normal state. To better understand the relaxation response's relationship to blood pressure, a study was designed to measure the relaxation response's ability to reduce blood pressure and attempted to identify the mechanisms by which it occurred. 24, unmedicated patients took an eight-week course of

relaxation response training. At the end of the trial, systolic blood pressure decreased by 15.4 mmHg and diastolic blood pressure by 10.6 mmHg. Over 50% of the participants blood pressure was effectively lowered. Researchers analyzed patients' genetics to determine if it had changed over the course of the relaxation response training. They found that lowered blood pressure corresponded to transcriptome changes. This alters the expression of genes which supports the idea that the inflammatory processes and immune functions are linked to oxidative stress and an imbalance of the circadian rhythm which may contribute to the blood pressure reductions (Bhasin et al, 2018).

Blood pressure control is important to maintain in all populations, but especially those who have diabetes due to the increased risk of mortality from cardiovascular issues. The American Heart Association has specifically mentioned the benefit to the relaxation response on lowering blood pressure and reducing the risk of strokes and heart attacks. The enthusiasm over meditation as an addition to the armamentarium for patients with hypertension, including those with diabetes, aids in the pursuit of meditation in modern medicine (Bhasin et al, 2018).

Diabetic Guilt

Chronic illness poses a unique type of stress and guilt on patients. "Perfection" cannot be achieved in most of these scenarios. Patients are chasing an impossible standard, second guessing their life choices, and constantly being told to "do better". Over 75% of type one diabetics have found there to be a social stigma surrounding their disease, causing stress (Brown 2022). A typical HbA1C level for a non-diabetic patient is around 6%. Diabetic patients are told to strive for this number, however, are lucky to get under 7%. This causes undue stress and worry associated with their diagnosis. This stress can cause complications to arise, like increased blood pressure and blood sugar. A study found that those with chronic disease are 58% more

likely to have feelings of guilt and shame surrounding their illness. It was concluded that this high percentage is likely associated with their relationship to their physical health. Meditation, mindfulness, and yoga have all shown significant signs of offering relief from these feelings (Cerna, 2021).

A 2014 study focused on the effectiveness of meditation and mindfulness on subjects with diabetes and coronary heart disease. Meditation classes ran for two hours and occurred weekly for five weeks. A comparison between pre-trial and post-trial self-report questionnaires. These being the Penn State Worry Questionnaire (PWSQ), and the White Bear Suppression Inventory (WBSI); these are both designed to indicate the level of stress/anxiety of the taker. The PWSQ scores decreased by an average of 5.7 points between the initial test and post-test. WBSI scores decreased by an average of 3.2 points. These data were found to be statistically significant. Additionally, patients reported reduced thought suppression and worry. Researchers concluded that patients with long term conditions would greatly benefit from meditation as a treatment to reduce prevalent health threats like anxiety and worry (Keyworth et al, 2014).

In the modern age, there are a multitude of ways in which one can self-medicate using meditation. One way to do this is by using the mobile application “Calm”. This is a mindfulness meditation app that has guided meditation, breathing exercises, and includes an approach to vipassana meditation. It has a variety of options to choose from, without judgment, with actual meditation techniques. Research done on this particular app used the “daily Calm” guided meditations and measured variables regarding the effectiveness of this practice. Over 100 participants results were measured, and this indicated a 7-point reduction on the perceived stress scale, and positive increases in all five categories of the Five Facet Mindfulness Questionnaire (these being: observe, describe, act aware, nonjudgement, and nonreactivity). Over half of the

participants said that they would use Calm in the future and over 85% was satisfied by their experience with this app. All of these data were statistically significant (Huberty et al, 2019).

Emotions of guilt and anxiety are natural when faced with a lifelong illness like diabetes. Meditation is a proven method that decreases these feelings and improves the quality of life. The prevalence of these techniques is not nearly high enough for the benefit they provide to patients. Such a simple way to improve worry should be a standard practice in the diabetic community.

Conclusion

Meditation and mindfulness truly are effective ways to reduce complications that come along with the diagnosis of diabetes. Cardiovascular concerns including hypertension, high blood glucose readings, and general guilt and anxiety of chronic illness have all been proven to be reduced with the implementation of meditation.

Research done to prove that meditation is successful in improving the lives of people diagnosed with chronic illness is a huge breakthrough in diabetic care. Although the diagnosis of diabetes is certainly not a death sentence, it impedes day-to-day life and mental health.

Meditation is a clinically proven and incredibly feasible way to optimize the quality of life of many patients. The reduction of blood glucose, hypertension, and overall worry via mindfulness and meditation are concrete ways to make headway in the pursuit of a long and healthy life for patients who have been diagnosed with diabetes.

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