

CASE REPORT

Self-directed Mindfulness Training and Improvement in Blood Pressure, Migraine Frequency, and Quality of Life

自我指导式的正念训练及改善高血压、偏头痛频率和生活质量

Formación autodirigida en la atención plena y mejora de la tensión arterial, la frecuencia de las migrañas y la calidad de vida

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Key Words

Mindfulness, meditation, hypertension, migraine, complementary and alternative medicine, case report, patient-centered care

ABSTRACT

Background: Interest in case studies has undergone a resurgence concurrent with increasing prioritization of illustrations of patient-centered care. However, substantial inclusion of the patient in these reports remains limited. Here, a doctor and patient collaborate to present her case report of self-directed mindfulness training and the subsequent changes in blood pressure, migraine frequency, and quality of life.

Methods: After receiving encouragement from her naturopathic doctor, the patient initiated an 8-week program in mindfulness training following the Kabat-Zinn protocol and logged her daily blood pressure and symptoms before and after meditation sessions over an 11-week period.

Results: Patient-reported outcomes included decreased perceived stress, increased focus, and a newfound sense of centeredness and calm. Changes in objective outcomes were clinically and statistically significant, including reductions in mean systolic and diastolic blood pressure between week 1 and week 11 ($P = .0001$ and $P = .0004$ for systolic and diastolic, respectively, by paired, 2-sided t -tests). Self-reported frequency of chronic migraine was also reduced. Critical to the patient's success was that mindfulness training was first approached in a simple, accessible manner prior to embarking on a deeper, extended experience.

Discussion and Conclusion: Self-directed mindfulness training can have a meaningful impact on both

subjective and objective health outcomes. It may take years of encouragement from a healthcare provider before a patient is ready to adopt a mind-body practice; it is important to recognize and counsel patients with messages appropriate to their stage of change and self-efficacy. Additionally, case studies that combine the voice of the clinician and the patient can provide useful illustrations of truly patient-centered care.

抽象

背景: 在对病例研究的兴趣重现的同时, 对以患者为中心的护理描述也得到进一步的重视。但是, 这些报告中有关患者的实在内容仍是有限。一名医生和患者共同完成她的病例报告, 在此介绍其自我指导式的正念训练及随后在高血压、偏头痛频率和生活质量上的变化。

方法: 在自然疗法医生的鼓励下, 该患者在接受 Kabat-Zinn 的治疗方案后, 开始了一项为期 8 周的正念训练计划, 并每天记录冥想前后的血压和症状, 为期 11 周。

结果: 病人报告的结果包括感觉压力降低、注意力更集中、并产生中心与平静感。客观结果有临床和统计上显著的变化, 包括第 1 周和第 11 周之间的平均收缩压和舒张压降低 (通过配对双面 t 检验, 收缩压和舒张压分别为 $P = .0001$ 及 $P = .0004$)。自我报告的慢性偏头痛频率也有所降低。患者成功的关键是先以简单、易于理解的方式开始正念训练, 之后再行更深层次、更久的训练。

讨论和结论: 自我指导式正念训

练可对主观和客观的健康结果产生有意义的影响。患者准备采取身心治疗方式前, 可能需要医疗服务提供者多年的支持; 重要的是识别及使用符合患者变化与自我效能阶段的话语以进行咨询。此外, 结合临床医生和患者感受的病例研究可为真正以患者为中心的护理提供有用的例证。

SINOPSIS

Fundamentación: El interés en los estudios de casos clínicos ha experimentado un resurgir coincidente con el aumento del énfasis en la ejemplificación de la atención centrada en el paciente. Sin embargo, la inclusión del paciente de forma sustancial en estos estudios sigue siendo limitada. En el presente estudio, un médico y su paciente colaboran para presentar un caso clínico de formación autodirigida en la atención plena y los posteriores cambios en la tensión arterial, la frecuencia de las migrañas y la calidad de vida.

Métodos: Tras ser animada a ello por su médico naturista, la paciente inició un programa de 8 semanas sobre formación en la atención plena siguiendo el protocolo de Kabat-Zinn, y registró su tensión arterial diaria y sus síntomas antes y después de las sesiones de meditación durante un periodo de 11 semanas.

Resultados: Los resultados indicados por la paciente incluyeron una disminución del estrés percibido, un aumento de la concentración, y una nueva sensación de encontrarse centrada y en calma. Los cambios en los resultados objetivos

fueron clínica y estadísticamente significativos, e incluyeron reducciones de la tensión arterial media sistólica y diastólica entre las semanas 1 y 11 ($P = 0,0001$ y $P = 0,0004$ para sistólica y diastólica, respectivamente, mediante pruebas de la *t* bilaterales para datos emparejados). La frecuencia de migrañas crónicas indicadas por la paciente también se redujo. Resultó decisivo para el éxito de la paciente el que la

formación en la atención plena se abordó en un principio de un modo sencillo y accesible, antes de embarcarse en una experiencia más profunda y amplia.

Argumentación y conclusión: La formación autodirigida en la atención plena puede tener un impacto significativo sobre la salud, tanto en su percepción subjetiva como en los resultados objetivos. Pueden ser necesarios años de estímulo por

parte de un profesional sanitario para que un paciente se encuentre preparado para realizar una actividad mente-cuerpo; es importante escuchar y aconsejar a los pacientes con mensajes apropiados a su estadio de cambio y autoeficacia. Además, los estudios de casos que combinan la voz del médico y la del paciente pueden ejemplificar de forma útil la atención genuinamente centrada en el paciente.

INTRODUCTION

Contemporary definitions of mindfulness emphasize bringing conscious attention to the inner and outer experience in the present moment. Cultivating mindfulness is thought to promote clear thinking and open-heartedness.¹ In the Buddhist tradition, mindfulness, or *satipatthana*, is one of the tenets of the Noble Eightfold Path leading to enlightenment. The introduction of mindfulness (and Buddhism in general) to Western culture in the 1970s is typically attributed to Thich Naht Hanh² and Jon Kabat-Zinn.³ Kabat-Zinn operationalized the Buddhist philosophy into a non-secular 8-week training program he termed mindfulness-based stress reduction (MBSR). In MBSR training, participants are taught to develop nonjudgmental awareness of their internal sensations including emotions, thoughts, and physical sensations such as pain.

Our current cultural environment has been termed one of “continuous partial attention”¹ as we increasingly find our attention split among multiple media stimuli such as email and cell phones and our present physical environment. Many people find the present situation overstimulating and overwhelming, resulting in unprecedented levels of perceived stress. Tools such as MBSR offer a potential solution by teaching individuals to selectively and intentionally focus their attention on the singular present moment.

Through experiential practices such as body scans, progressive muscle relaxation, and seated meditation, a state of calm focus and present-moment mindfulness is developed. The increased state of mindfulness then allows one to more fully engage in making conscious, intentional life choices; it promotes self-efficacy. Yet one of the clinical challenges introducing MBSR for somatic conditions is convincing patients to take the time to try it before medical conditions worsen. While MBSR training is perhaps the most widely studied in the medical literature, it takes more self-directed patient effort than taking medication or even exercise.

MBSR has been evaluated in medical conditions ranging from chronic pain to cancer, depression to diabetes.⁴⁻⁶ Populations of interest have included terminally ill patients and their caregivers, prisoners, healthcare professionals, and many others.^{1,4,7-10} In 2013, reports of 75 clinical studies of MBSR appeared in

a MEDLINE search. Despite this hefty literature base, only one of these publications contains a case report that includes the patient’s perspective (the patient was a Taiwanese physician).¹¹

The value of reporting medical cases has recently experienced a resurgence. This trend follows others that point toward a re-humanization of medicine, such as the recent creation of the Patient-Centered Research Institute (PCORI),¹² promotion of patient-centered medical home model,¹³ and re-contextualization of guideline-directed evidence-based medicine with the wisdom of clinical experience and patient preferences.¹⁴⁻¹⁶ Here, a patient and doctor co-present a case study reporting the experience of self-directed mindfulness training on subjective experience and biomedical outcomes.

PRESENTING CONCERN AND CLINICAL FINDINGS

MR, a 45-year-old, happily married female (with two dogs) originally visited the lead author (EO) in 2009 seeking natural and lifestyle-based approaches to multiple chronic conditions. Among MR’s concerns were debilitating migraines, hypertension, pre-diabetes, and overweight. Her headaches were insufficiently controlled with atenolol and triptan medications, and she regularly reached her maximum dose and frequency. When this occurred, she was forced to leave work and retreat to bed for up to 24 hours.

At the first visit, MR’s blood pressure was 152/90 mmHg with an angiotensin-converting enzyme (ACE) inhibitor, heart rate 78 beats per minute, body mass index (BMI) 30, and fasting glucose 95 mg/dL. MR had been working hard to lose weight for several years and had successfully lost 60 pounds. She accomplished this through a highly committed exercise program including regular weight and cardio training, swimming, and walking and a healthful, low-calorie diet. As a result of many years of participating in different diet and weight-loss programs, MR experienced food and eating as an additional source of stress and emotional distress. MR’s work environment is highly stressful; she is an academic administrator at a private university. MR reports to two superiors, and balancing the workload can be challenging. The work varies greatly, including monitoring academic progress of students, working with students in need of hardship withdrawals, overseeing a

small staff, managing scheduling difficulties, and registering new students university-wide. It was not unusual for MR's email inbox to exceed 500 messages.

Over the course of the next few years, MR and EO tried numerous therapeutic approaches to address her chronic health concerns and cardiometabolic risk factors. EO has extensive clinical and research experience in these domains, including exercise prescription,¹⁷ dietary^{18,19} and holistic approaches to diabetes^{20,21} and hypertension,^{22,23} health promotion, and health behavior change in general.²⁴⁻²⁶ For example, the addition of riboflavin improved MR's migraines sufficiently to allow discontinuation of the atenolol she had been taking preventively. A series of craniosacral therapy sessions resulted in transiently reduced headache pain and perceived stress, but results were not long lasting and the time required for frequent treatments was incompatible with her demanding work schedule. Dietary strategies included removal of potential food triggers, high protein low-calorie meal-replacement drinks, participation in a structured nutrition program,¹⁸ referral to an intuitive eating counselor, and frequent one-on-one health promotion–counseling visits covering mindfulness-based approaches to food and eating behaviors. After careful elimination and re-introduction of many foods, the identification and subsequent elimination of artificial sweeteners further reduced migraines. Over the course of 4 years, MR repeatedly lost and regained up to 25 lbs. Weight loss was maintained only with an extremely restrictive diet that was not sustainable for her.

DIAGNOSTIC FOCUS AND ASSESSMENT

Despite near-heroic motivation and adherence to the numerous perturbations of lifestyle change, when discussion of risk factors turned to stress management and the potential contribution of MR's high-pressure work environment, MR would repeatedly state that "It is what it is, and I can't change anything about it." In addition to the work-related stressors, MR experienced the traumatic long-term illness and eventual loss of her sister and other family-related stressful events. It was the opinion of EO that stress and the resultant chronic activation of the sympathetic nervous system were contributing to the hypertension, migraines, and overweight.

THERAPEUTIC FOCUS

During the summer of 2012, MR's father was hospitalized. Just prior to this, MR and EO had again discussed the role of stress in her chronic health conditions. EO had recommended reading about mindfulness, specifically Jon Kabat-Zinn's *Wherever You Go, There You Are: Mindfulness Meditation in Everyday Life* (New York: Hyperion; 2005) MR looked at a number of books on mindfulness and decided on *Mindfulness for Dummies* (West Sussex, England: John Wiley & Sons; 2010) because it seemed like a more manageable start than some of the other offerings. She began reading it shortly before she went to see her dying father.

Following a transformative experience (described below), she was motivated to investigate mindfulness practices more deeply. MR obtained a copy of Kabat-Zinn's *Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness* (New York: Delta Trade Paperbacks; 1991) and began following his 8-week protocol in mindfulness. Being an academic and scientist, she logged her blood pressure readings and other symptoms daily throughout the program.

I picked up a book on mindfulness in mid June, which ultimately ended up being very well timed. I had just started reading it when my father's health began failing. By the time the week was over I was on a plane, book in hand, not sure what to expect in California. Conditions were not ideal for trying some of the exercises, but I was reading and trying some things and I think it really helped me get through the long days and nights with less stress than I expected. I ended up being awake with my dad all night on Saturday and after not much sleep during the day, had a shift 11 PM to 4 AM Sunday into Monday. Doing some of the mindfulness exercises helped pass the time, gave me some focus to appreciate the wrinkles on my father's face and the gray hair I might have contributed to. I was privileged to be the one with him when he passed; a gift to his youngest daughter.

The self-directed 8-week mindfulness intervention consisted of following a modified version of the homework in Kabat-Zinn's 8-week program in *Full Catastrophe Living* with CD-based guided meditations. During the first 8 weeks, meditation sessions were 45 minutes and followed various techniques. After completion of the 8-week program, MR adapted the program to better fit with her work life; 3 days per week (Monday, Wednesday, and Friday), meditation sessions are 20 to 30 minutes; meditation sessions on Tuesday, Thursday, Saturday, and Sunday are 45 minutes. Her meditation sessions followed a range of practices including yoga *asanas* ending with *savasana*, supine body scans, and seated meditation.

OUTCOMES

The results of 8 weeks of self-directed mindfulness training plus 3 additional weeks of customized mindfulness practice resulted in both personally and clinically meaningful outcomes.

From the patient's perspective, perceived stress was dramatically reduced. Not only was MR calmer about her previously overwhelming workload but her workload actually decreased because of increases in her efficiency and focus. For example, her email inbox, a source of perpetual stress, came under control. Rather than checking email while multitasking, resulting in the need to flag numerous messages for later attention (thereby increasing workload), MR found she could sustain focus on the task at hand and complete tasks, thereby permanently

“checking them off the list.” Using MBSR focusing techniques, she turned email into tasks that were immediately accomplished and the email inbox was successfully reduced to very few items and is now emptied several times a day. Things are not lost in a huge inbox, nor is there a fear that something important is lost there. Focus can be maintained without MR wondering if something important is falling through the cracks. Emotionally, MR feels calm and confident in managing the workload. Leaving work at the end of the day with an empty workload means that at home she can be more present with her family because she is not stressed about work.

Clinically important objective measures of disease risk also improved during her mindfulness meditation experience. MR measured and recorded her blood pressure using an automated blood pressure monitor (Omron model HEM-609, Lake Forest, Illinois) immediately before and after her meditation sessions (Table). In the first 8 weeks of mindfulness training, baseline blood pressure was typically elevated and classifiable as Stage I hypertension. Following 45 minutes of meditation, blood pressure was reduced into the prehypertensive range and into the normal range after 10 weeks of practice. The maximal mean reduction in both systolic and

diastolic blood pressure occurred after approximately 4 weeks (-18.5 mm Hg systolic and -25.8 mm Hg diastolic). By week 7, both systolic and diastolic blood pressure had come within the prehypertensive range and continued to decline to optimal levels (Figure 1). At the end of the 8-week program and an additional 3 weeks of continued self-directed practice and data recording, pre-meditation mean systolic and diastolic blood pressures were significantly reduced. When all daily blood pressure observations were combined, the mean reductions were highly significant: $P < .0001$ for systolic and $P < .0004$ for diastolic blood pressure reductions over the 11-week period (Figure 2). Notably, as blood pressure came within the normal range, the difference before and after meditation also decreased, suggesting MR was maintaining a lower sympathetic tone.

The additional symptoms and behaviors she tracked, such as migraines and exercise, also were reviewed. Migraine frequency was decreased, and through MR's mindful attention to her inner experience, it was determined that migraines were now occurring only in conjunction with the phase of her menstrual cycle. Knowledge of this enabled her to plan accordingly and use her migraine abortive medications

Table Blood Pressure Measurements Over 11 Weeks of Mindfulness Meditation

	Before Meditation		After Meditation		Difference	
	Mean SBP (SD)	Mean DBP (SD)	Mean SBP (SD)	Mean DBP (SD)	Mean SBP (SD)	Mean DBP (SD)
Wk 1	149.2 (5.5)	97.3 (6.4)	132 (11.0)	84.6 (5.7)	-17.2	-12.7
Wk 2	143.8 (5.8)	100.2 (5.2)	135.5 (9.0)	85 (6.0)	-8.3	-15.2
Wk 3	149.7 (9.4)	104.8 (6.4)	133 (14.1)	85.2 (12.7)	-16.7	-19.7
Wk 4	154.2 (7.9)	107.5 (5.3)	135.7 (9.5)	81.7 (8.1)	-18.5	-25.8
Wk 5	147 (11.0)	102 (6.8)	140.5 (12.4)	94.2 (11.8)	-6.5	-7.8
Wk 6	136.7 (17.7)	90.8 (14.8)	127.5 (9.7)	82.7 (12.5)	-9.2	-8.2
Wk 7	130.5 (14.6)	84.2 (8.1)	126.5 (8.9)	84.3 (5.9)	-4	0.2
Wk 8	130.8 (9.1)	80 (7.8)	126 (4.6)	81.7 (8.1)	-4.8	1.7
Wk 9	124.2 (8.3)	82.7 (3.2)	127.3 (5.8)	78.8 (4.8)	3.2	-3.8
Wk 10	122 (7.1)	73.9 (4.1)	119.3 (4.7)	76.1 (5.4)	-2.7	2.3
Wk 11	114.5 (6.0)	68 (5.8)	112.7 (5.1)	72.7 (5.6)	-1.8	4.7

Abbreviations: DBP, diastolic blood pressure; SBP, systolic blood pressure, measured in mm Hg.

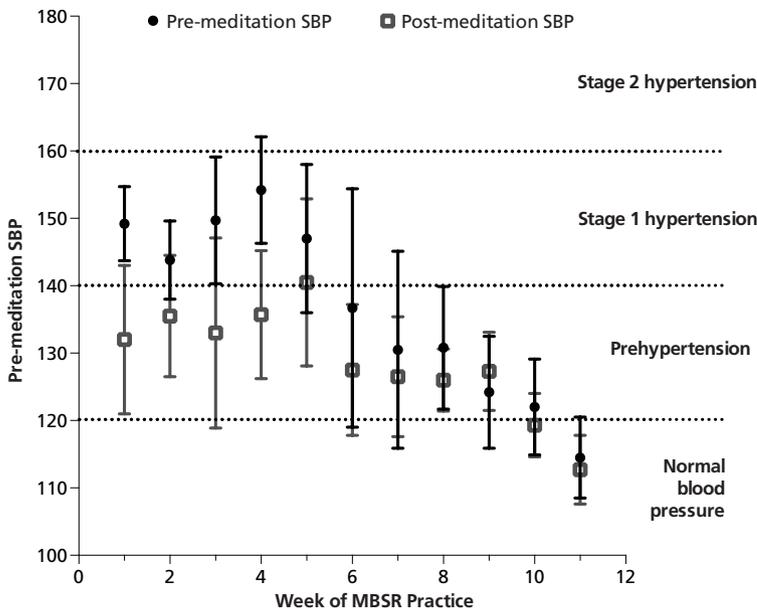


Figure 1a Systolic blood pressure over 11 weeks of MBSR. Abbreviations: MBSR, mindfulness-based stress reduction; SBP, systolic blood pressure.

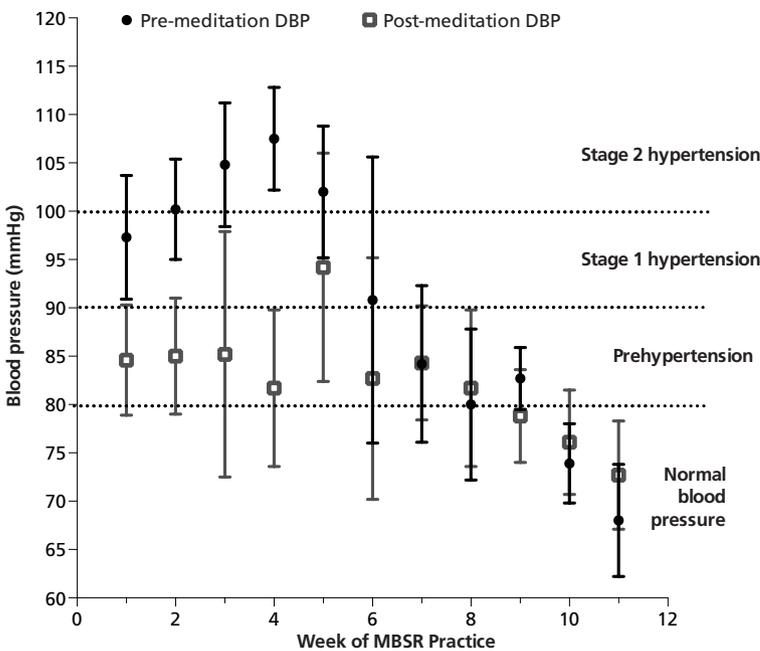


Figure 1b Diastolic blood pressure over 11 weeks of MBSR. Abbreviations: DBP, diastolic blood pressure; MBSR, mindfulness-based stress reduction.

appropriately. Body weight, which has been a long-term struggle, has not changed in the 11 weeks of mindfulness meditation. MR has taken the “attitudes and commitment” portion of her 8-week MBSR training very seriously. In reflecting on her long-term struggle with weight loss, she now says, “It cannot be about goals and expectations. Non-judgment and acceptance are integral pieces of that attitude.” Acceptance does not mean MR is happy with her weight but that she accepts where she is today and continues to do her best in maintaining a healthy lifestyle.

FOLLOW-UP

At last report (week 17), during the preparation of this article, MR and EO discussed MR’s future intentions for continuing her mindfulness practice. Her blood pressure remains in the 120s/70s, weight has not changed, and her inbox remains at zero. MR states that a recent musculoskeletal injury has triggered a recurrence of headaches, making evaluation of her chronic migraines unclear. MR reports that she continues to experiment with her practice and plans to try some different guided meditations. In addition, she strives to bring more mindfulness into daily activities like walking from the bus to work or taking a few moments before lunch to reset. MR’s introduction to mindfulness occurred in the context of preparing to visit her dying father, an experience that had a profound healing effect on her. She reflects on how she will enter into future experiences of personal and professional stress with a deeper mindfulness practice.

I feel like I have a new tool to deal with an aging mother in another state, the uncertainty of our modern world, and with the students and staff I work with who are experiencing their own traumatic life events. Just as regular physical exercise has become important to my daily routine and ultimately health and well-being, mindfulness practice is now part of my daily life and has already had effects on my health and well-being.

DISCUSSION

This case report summarizes the perspectives of both the patient and provider following an experiential introduction to mindfulness meditation through an 8-week self-directed program developed by Kabat-Zinn. The outcomes reported here are both personally and clinically significant and are consistent with the body of literature reporting positive health and behavioral changes following exposure to MBSR in clinical trial settings. Interestingly, this experience exemplifies a case in which stress reduction via MBSR was an effective strategy for blood pressure reduction; in this case, blood pressure was reduced from Stage 1-2 hypertension to normal in only 11 weeks; this proof-of-concept case report comes only months after the neutral HARMONY trial, which demonstrated no benefit of MBSR practices to reduce mean blood pressure in mildly hypertensive adults.²⁷

The strengths of this manuscript include the close collaboration of the patient and doctor as coauthors, providing a vivid and valid illustration of the potential depth of patient-centered care. To our knowledge, significant reductions in blood pressure and concurrent migraine frequency from MBSR practice have not been previously reported in the medical literature. The detailed self-care records the patient made of her objective and subjective experience, which enabled an accurate reporting of retrospective events, is also a strength. An additional strength of this case report is the formal

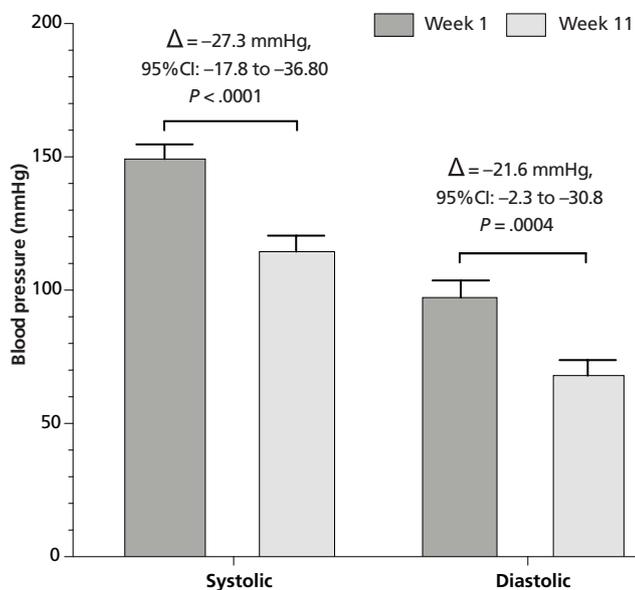


Figure 2 Changes in mean daily blood pressure over 11 weeks of mindfulness meditation.

statistical analysis of the observed blood pressure changes, which provide useful confirmation that a meaningful physiological change occurred, as opposed to just minor changes in blood pressure variability. The limitations of the case report are that the reported experience does little to elucidate the mechanisms by which mindfulness training reduces blood pressure or migraine frequency, and this report reflects only the experience and outcomes of a single individual. Institutional review board approval was not obtained as the case described occurred within the course of routine care delivery rather than in a research setting.

CONCLUSION

Self-directed mindfulness training can have a meaningful impact on both subjective and objective health outcomes, including chronic conditions like migraines and hypertension. It may take years of encouragement from a healthcare provider before a patient is ready to adopt a mind-body practice. It is important to recognize and counsel patients with messages appropriate to their stages of change. Additionally, case studies that include both the medical and patient perspectives provide an example of the richness that can be found in truly patient-centered care.

REFERENCES

- Ludwig DS, Kabat-Zinn J. Mindfulness in medicine. *JAMA*. 2008;300(11):1350-2.
- Hanh TN. *The miracle of mindfulness*. Boston, MA: Beacon Books; 1975.
- Kabat-Zinn J. *Full catastrophe living: using the wisdom of your body and mind to face stress, pain, and illness*. New York, NY: Delta Trade Paperbacks; 1991.
- Cramer H, Lauche R, Paul A, Dobos G. Mindfulness-based stress reduction for breast cancer—a systematic review and meta-analysis. *Curr Oncol*. 2012 Oct;19(5):e343-52.
- Hartmann M, Kopf S, Kircher C, et al. Sustained effects of a mindfulness-based stress-reduction intervention in type 2 diabetic patients: design and first results of a randomized controlled trial (the Heidelberger Diabetes and Stress-study). *Diabetes Care*. 2012;35(5):945-7.
- Marchand WR. Mindfulness-based stress reduction, mindfulness-based cognitive therapy, and Zen meditation for depression, anxiety, pain, and psychological distress. *J Psychiatr Pract*. 2012;18(4):233-52.
- Perkins R. The efficacy of mindfulness-based techniques in the reduction of stress in a sample of incarcerated women. Doctoral dissertation, Florida State University; 1998.
- Shapiro SL, Schwartz GE, Bonner G. Effects of mindfulness-based stress reduction on medical and premedical students. *J Behav Med*. 1998;21(6):581-99.
- Grossman P, Niemann L, Schmidt S, Walach H. Mindfulness-based stress reduction and health benefits. A meta-analysis. *J Psychosom Res*. 2004;57(1):35-43.
- Mackenzie CS, Poulin PA, Seidman-Carlson R. A brief mindfulness-based stress reduction intervention for nurses and nurse aides. *Appl Nurs Res*. 2006;19(2):105-9.
- Sun TF, Kuo CC, Chiu NM. Mindfulness meditation in the control of severe headache. *Chang Gung Med J*. 2002;25(8):538-41.
- Patient-Centered Outcomes Research Institute (PCORI). Patient Protection and Affordable Care Act [Section 6301 and Section 10602, Public Law 111-148]. US Government Accountability Office; 2010.
- Reid RJ, Fishman PA, Yu O, et al. Patient-centered medical home demonstration: a prospective, quasi-experimental, before and after evaluation. *Am J Manag Care*. 2009;15(9):e71-87.
- Jenicek M. The hard art of soft science: Evidence-based medicine, reasoned medicine or both? *J Eval Clin Pract*. 2006;12(4):410-9.
- Hay MC, Weisner TS, Subramanian S, Duan N, Niedzinski EJ, Kravitz RL. Harnessing experience: exploring the gap between evidence-based medicine and clinical practice. *J Eval Clin Pract*. 2008;14(5):707-13.
- Sundar S. Some forms of knowledge are more equal than others. *BMJ*. 2012;345:e7429.
- Oberg EB. Physical activity prescription: our best medicine. *Integr Med Clin J*. 2007;6(5):18-22.
- Oberg EB, Bradley RD, Allen J, McCrory MA. Evaluation of a naturopathic nutrition program for type 2 diabetes. *Complement Ther Clin Pract*. 2011;17(3):157-61.
- Oberg EB, Pagano G, Kesten D, McCrory MA, Scherwitz LS. How one eats may be more important than what one eats: eating styles correlate with glycemic control more strongly than macronutrient intake. Composing effective patient care: American Association of Naturopathic Physicians. Phoenix, AZ: Raintree Publishing; 2011.
- Bradley R, Sherman KJ, Catz S, et al. Adjunctive naturopathic care for type 2 diabetes: patient-reported and clinical outcomes after one year. *BMC Comp Altern Med*. 2012;12:44.
- Oberg EB, Bradley R, Hsu C, et al. Patient-reported experiences with first-time naturopathic care for type 2 diabetes. *PLoS One*. 2012;7(11):e48549.
- Oberg EB. Mind-body techniques to reduce hypertension's chronic effects. *Integr Med Clin J*. 2009;8(5):2-7.
- Bradley RD, Kozura E, Kaltunas J, et al. Observed changes in risk during naturopathic treatment of hypertension. Evidence-based *Comp Altern Med*. doi:10.1093/ecam/nep219.
- Oberg EB, Fitzpatrick AL, Lafferty WE, LoGerfo JP. Secondary prevention of myocardial infarction using nonpharmacologic strategies; analysis of a medicaid cohort. *Prev Chronic Dis*. 2009;6(2):A52.
- Bradley RD, Oberg EB. Integrative treatments to reduce risk for cardiovascular disease. *Integr Med Clin J*. 2009;8(1):26-32.
- Oberg EB, Frank E. Physicians' health practices strongly influence patient health practices. *J R Coll Physicians Edinb*. 2009;39(4):290-1.
- Blom K, How M, Dai M, et al. Hypertension analysis of stress reduction using mindfulness meditation and yoga (The HARMONY study: study protocol of a randomised control trial). *BMJ Open*. 2012 Mar 5;2(2):e000848.

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