EFFECTS OF THE *TRANSCENDENTAL MEDITATION*® TECHNIQUE ON POST-TRAUMATIC STRESS DISORDER

Presented by

TM® for Veterans

Operation Warrior Wellness
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The Effects of the *Transcendental Meditation* Technique on PTSD

Post-Traumatic Stress Disorder (PTSD) is a serious and disabling condition that affects approximately 6% to 7% of adults in the U.S. over their lifespan.[1] The incidence is at least two to three times greater in veterans and active-duty personnel who have seen combat.[2-3] PTSD is associated with comorbidities, such as major depression, substance abuse, suicide, and poor physical health.[4-6] It is widely recognized that current pharmacological and psychotherapeutic approaches to treating PTSD are not fully adequate because of limitations in both effectiveness and acceptability to patients.[7] As a consequence, there is an acknowledged need to identify new approaches to treating PTSD that are both effective and acceptable.

Transcendental Meditation (TM) is a simple, natural, easily learned technique that is practiced twice daily, sitting comfortably in a chair. It has been extensively researched and learned by millions of Americans. The TM technique is not a philosophy or a religion and requires no belief or change in lifestyle. The more than 420 peer-reviewed studies conducted on the technique over the last 50 years have demonstrated that it is effective at treating stress-related conditions, such as hypertension, anxiety, and depression, as well as enhancing mental and physical health and cognitive function.[8,9] Studies on physiological outcomes have shown that the effects of TM practice are opposite to those produced by stress and the fight-or-flight response.[10,11] Psychological research on TM indicates effects counter to the twenty DSM-5 symptoms associated with PTSD.[12-27] No adverse effects have been reported in three published reviews of the TM research. [28-30]

The first study on the TM technique and PTSD, a randomized controlled pilot trial on Vietnam War veterans conducted in the early 1980s, found significant improvement in PTSD symptoms and a range of comorbidities, including depression, anxiety, insomnia and alcohol use, compared to controls undergoing individual psychotherapy. [31] In recent years, additional studies have been conducted, including a major study funded by the U.S. Department of Defense and published in *The Lancet Psychiatry*.[32] As of spring 2019, there are 14 studies on the effects of TM on PTSD symptoms: 11 peer-reviewed and three non-peer-reviewed studies. Nine of these are on veterans and active military. Four studies with veterans are randomized controlled trials (RCTs) and two with civilians are RCTs. All the studies found that TM practice had large effect sizes in reducing PTSD symptoms. This finding was consistent across study design, PTSD population, and researcher affiliations.[30-34,42,73-75,88-92]

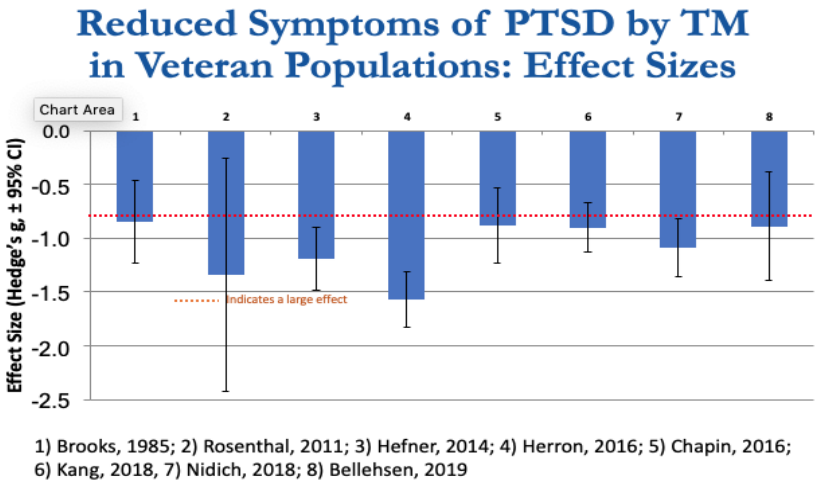

Figure 1: Effect Sizes of Studies on the *TM* Technique and PTSD in Veteran Populations

Note: Effect size in statistics provides a quantitative measure of the magnitude (or effect) of a treatment. An effect size of .2 is considered small, .5 medium, and .8 or greater large.

Figure 1 presents the within-group effect sizes of the eight veteran studies for which effect size was calculated.[30-32,73-75,88,90] These effect sizes are comparable to those produced by Prolonged

Exposure and Cognitive Processing Therapy reported by Steenkamp in her review of psychotherapy for military-related PTSD (Cohen *d* range, 0.78-1.10).[7]

The largest of the PTSD studies using the TM technique to date, Nidich (2018),[32] was a non-inferiority trial, designed to assess directly whether TM practice was non-inferior to Prolonged Exposure (PE), considered the "gold-standard" therapy for treating PTSD. Both the TM technique and PE were compared to an active Health Education (HE) treatment. The study randomly assigned 203 veterans with clinical PTSD (CAPS score > 45) to either the Transcendental Meditation technique (N=68), PE (N=68), or HE (N=67). Each treatment provided 12 sessions, 90 minutes each, over 12 weeks, and included daily home practice. Figure 2 shows the results for PTSD symptoms and depression. All 202 eligible patients randomly assigned to treatment were included in the intent-to-treat analyses, regardless of treatment dropout or missing post-test data. The study found that both TM practice and PE were significantly more effective than HE. TM practice was significantly non-inferior to PE for CAPS (Clinician Assisted PTSD Scale), PCL-M (PTSD Checklist-Military, a paper and pencil instrument), and depression (PHQ-9) scores when using baseline dependent score, number of PTSD medications, sex, and number of years since discharge from the armed forces as covariates (p=0.0002). Percentages of participants with clinically significant improvement on the CAPS (≥10 point reduction) were TM=62%, PE=42%, and HE=32%.

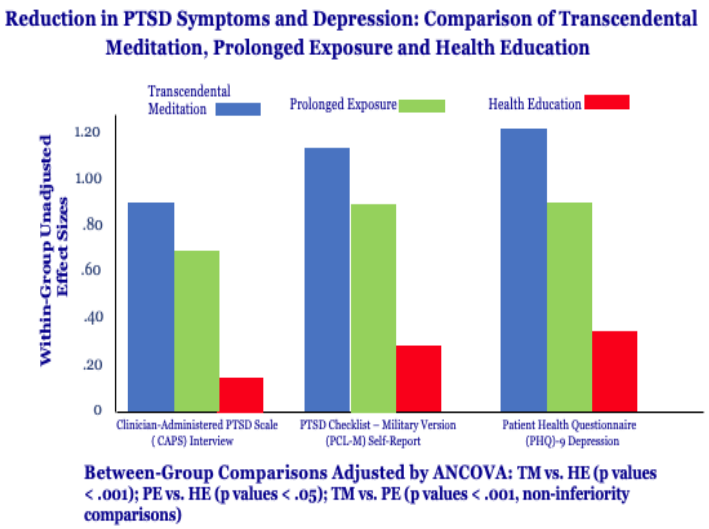

Figure 2: Comparison of *TM*, Prolonged Exposure and Health Education on PTSD and Depression

Speed of Effect

While trauma-focused therapies have significant effects on reducing PTSD symptoms, these effects are most clearly seen after the first month of treatment in standard distributed formats for delivery. With the TM technique, effects for many people are experienced almost immediately. Research has shown that TM practice produces clinically meaningful reductions in PTSD at 10 days[33] and two weeks.[34] Nidich found that reduction in PTSD as measured by the PCL-M occurred more quickly with the TM technique than with Prolonged Exposure (see Figure 3).[32]

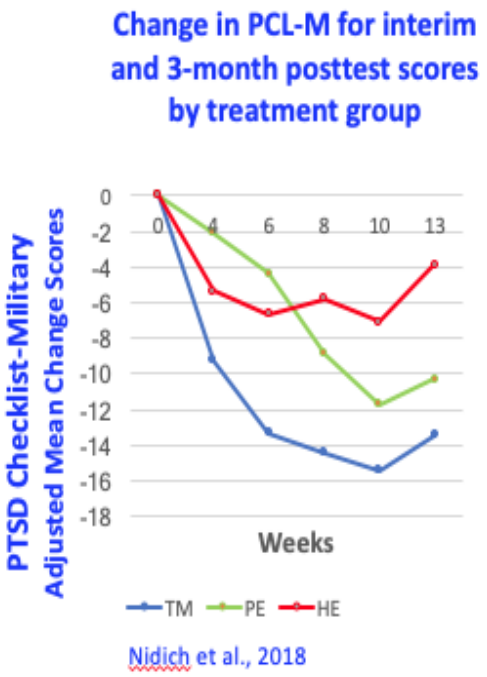

Figure 3: Change in Interim and 3-Month Test Scores

Effectiveness of *TM* in Treating Comorbidities of PTSD

Approximately 80% of individuals with PTSD meet criteria for at least one other psychiatric diagnosis and a substantial number have three or more other psychiatric diagnoses.[35,36] Chief among these are depressive, substance abuse, and anxiety disorders.[36] Sleep disorders are also very prevalent—75% of veterans surveyed by the Wounded Warrior Project in 2017 reported sleep problems.[37]A non-psychiatric comorbidity of PTSD is increase in cardiovascular risk. Veterans with PTSD have 77-85% greater likelihood of developing high blood pressure than those without PTSD.[38] These comorbidities compound the effects of PTSD, leading to greater disability, greater cost, and greater suffering. A large body of research, including with military populations, has demonstrated the effectiveness of the TM technique in treating these conditions, which strengthens the justification for including TM practice as a first-line treatment for PTSD.

Depression: A meta-analysis of the five TM studies focused on combat veterans with PTSD that included depression as a dependent variable shows that TM practice has a large average effect (-.96) on reducing depression in this population (see Figure 4). Randomized controlled trials on other patient populations have found that the TM technique reduced depression in patients with chronic heart failure,[39] ventricular hypertrophy,[40] HIV,[41] and in prison inmates[42] and pre-hypertensive young adults.[43] Controlled trials on the general population have found that TM practice reduced depression in business managers,[44] Japanese industrial workers,[45] high school students,[46] and school teachers suffering from burnout.[47]

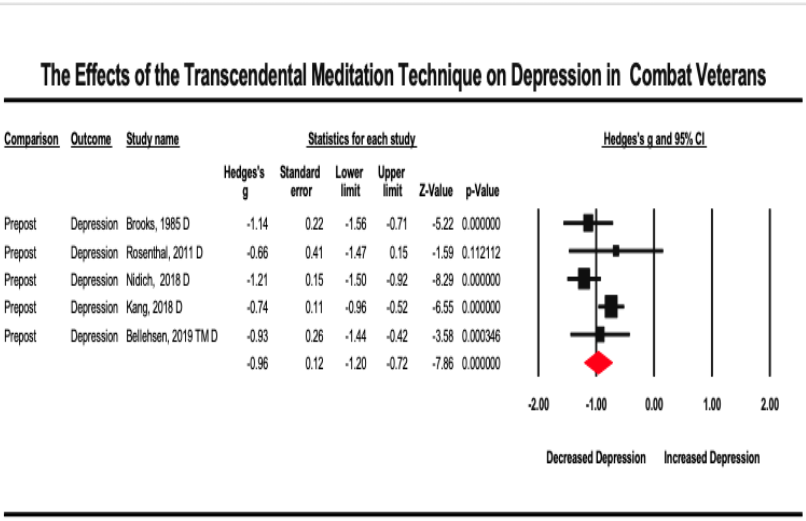

Figure 4: Effects of *TM* on Depression in Combat Veterans

Substance Use Disorder: In meta-analyses, the TM technique was more effective in reducing smoking, alcohol consumption, and illicit drug use than conventional programs, whether or not these were combined with relaxation techniques.[48] In a randomized controlled study of 118 chronic male alcoholics undergoing in-residence rehabilitation treatment, patients practicing TM for 18 months showed significantly fewer drinking days than other groups, including patients receiving EEG neurotherapy and conventional addiction counseling.[49] A recent study of patients in a residential rehabilitation program for alcohol use disorder found that those who were closely adherent to twice-daily practice of TM (recommended schedule) were significantly less likely than controls to resume any drinking (25% vs 59%) or heavy drinking (0% vs. 47%) post-discharge.[50]

Anxiety: A meta-analysis of 146 independent outcomes compared the effects on psychosocial stress (anxiety) of all stress-reduction and relaxation techniques that had been reported in the scientific literature. The TM technique had a moderate to large effect on reducing anxiety (ES=.7) and reduced anxiety to a significantly greater extent than other forms of meditation, relaxation, or stylized rest.[51,52] A meta-analysis of 30 studies found that TM practice was more effective in reducing trait anxiety than mindfulness or other meditation techniques.[53, 54] Another meta-analysis of 16 randomized controlled trials found TM practice to be especially effective in reducing anxiety in people with elevated anxiety, including prisoners, war veterans, and war refugees, with rapid reductions in anxiety within the first two weeks of practice.[55] A three-month randomized controlled study of secondary school teachers found that TM practice significantly reduced perceived stress, depression and overall teacher burnout.[56] Two months of regular TM practice significantly reduced perceived stress and mood disturbance in family caregivers, including reductions in anxiety, depression, anger, confusion, and fatigue, and increase in spiritual well-being.[57]

Sleep Disorders: A three-month randomized controlled trial found the TM technique improved sleep in war veterans with PTSD compared to psychotherapy.[31] A controlled longitudinal study reported improved sleep as well as reduced hostility and decreased neuroticism in incarcerated offenders.[58] A five-month controlled study of 735 Japanese industrial workers found that TM practice reduced the number of workers with delayed sleep onset by 30% and those with middle-of-the-night insomnia by 26%.[45]

Hypertension: Nine randomized clinical trials have demonstrated that the Transcendental Meditation technique significantly reduces blood pressure in persons with hypertension,[59-66] although no published studies to date have reported blood pressure outcomes in veterans with PTSD. A meta-analysis of 107 independent studies on stress-reduction and hypertension found that the Transcendental Meditation technique reduced blood pressure to a significantly greater extent than other mind-body interventions that have been studied in this regard.[68] Further independent meta-analyses have confirmed that TM practice reduces blood pressure.[69,70] A scientific statement from the American Heart Association (AHA) in 2013 found evidence that TM reduces blood pressure and recommended that "TM may be considered in clinical practice to lower BP." The AHA report found insufficient evidence to recommend other meditation techniques, including mindfulness practices.[71]

Comparison of the *TM* Technique and Mindfulness Meditation

The TM technique and mindfulness meditations involve different practices and have different physiological effects.[72]

MBSR (Mindfulness-Based Stress Reduction) is the mindfulness program with the most studies on PTSD symptoms and thus most open to comparison with the TM technique. A meta-analysis comparing the six peer-reviewed TM studies on veterans with PTSD[30-32,73-75,] and seven studies on MBSR[76-82] found the summary effect for MBSR on PTSD reduction was moderate, g = -.51, and for TM practice large, g = -1.14. Figure 5 shows the within-group changes from pretest to posttest for the PCL for all published PTSD research on the TM technique and MBSR.

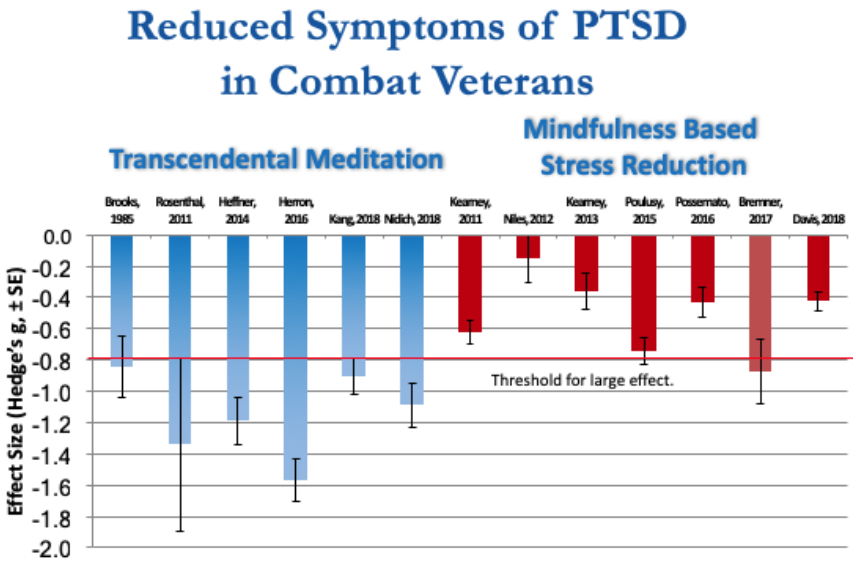

Figure 5. Within-group effect sizes for *TM* and MBSR

Acceptability to Veterans and Feasibility of Program Implementation

There is ample evidence that TM practice is acceptable to veterans. More than 4,000 veterans, active duty soldiers and military cadets have learned the technique in the last decade through organized programs associated with the David Lynch Foundation and TM for Veterans. Thousands more have learned independent of these programs. Boulder Crest Retreat Center, an award-winning retreat center for veterans with PTSD operating in Virginia and Arizona, has made the TM technique a cornerstone of its program, and all veterans who attend learn TM. More than 300 veterans have learned through this program, and the reaction to learning TM has been consistently positive.

Research data also supports the acceptability of TM practice to veterans with PTSD. In the 2018 *Lancet Psychiatry* study comparing the TM technique to Prolonged Exposure therapy, the non-completion rate for individuals in the Prolonged Exposure group was 38% vs. 25% for the TM group.[32] This indicates that TM practice is at least as acceptable as PE, which is currently considered the "gold standard" treatment for PTSD used in VA Medical Centers throughout the country.

The feasibility of implementing the TM technique with veterans has also been demonstrated. The technique has been taught effectively to veterans and active-duty military personnel in a variety of program settings—in-residence, out-patient, and through local *TM* Centers. Two in-residence programs for veterans using the TM technique are the Boulder Crest Retreat Center and the VA-funded National Substance Use Disorder Pilot Program. Out-patient institutional programs have been implemented in numerous VA Centers and at the Eisenhower Medical Center, Fort Gordon, Georgia. TM has been successfully introduced as a resilience-building technique to over 1,000 cadets at Norwich University and to more than 100 officers at the National Defense University in Washington, D.C. The TM technique has also been taught to veterans, with excellent results, through *Transcendental Meditation* Centers around the country.[73]

Cost Effectiveness of the *Transcendental Meditation* Technique

The Congressional Budget Office in 2012 calculated that the average four-year cost of treating a veteran with PTSD through a VA facility was $20,200. PTSD-specific treatment for veterans amounted to $10,000, nearly half of the total cost of treatment for veterans with PTSD at the VA. These costs are front-loaded, with the cost of PTSD-specific treatment being $4,100 in the first year.[83] The lifetime cost of the Transcendental Meditation program ranges from $960 to $2500 per veteran, depending on implementation option—at a *TM* Center, out-patient at a VAMC/medical clinic, or inpatient with long-term follow-up. While using the Transcendental Meditation technique as a first-line treatment for PTSD would not entirely eliminate other diagnostic and treatment costs of PTSD, there are significant potential cost efficiencies from using TM as a primary PTSD treatment. Research has shown, for example, reduction in psychotropic drug medications in active-duty personnel with PTSD or anxiety disorder.[67] The potential cost-savings from using the TM technique are augmented by its effectiveness in treating comorbid conditions. Health care utilization research on general populations has shown that TM practice decreases hospital admissions in all categories of disease.[84] Research has also shown reductions in health care costs across diverse populations: high cost,[85] elderly,[86] and non-elderly populations.[87]

Conclusion

Decisions about clinical application and policy should be based on the convergence of evidence from a variety of sources that arrive at the same conclusion. More than 400 peer-reviewed studies, including more than 50 on PTSD and its comorbidities, have documented the benefits of TM practice for mind, body, and behavior. The research suggests that the TM technique is as effective at reducing PTSD symptoms as currently utilized approaches while also being effective at treating comorbidities of PTSD. It is acceptable to veterans and feasible to implement. The convergence of evidence suggests that TM practice offers an effective and safe first-line or adjunctive method for treating PTSD as well as reducing attendant expenses.

Notes

1. Ostacher M, Cifu A, Management of Posttraumatic Stress Disorder. *JAMA.* 2019 321(2): 200-201.
2. Tanielian T, Jaycox L. Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery. Santa Monica, California: RAND Corporation; 2008.
3. https://medlineplus.gov/magazine/issues/winter09/articles/winter09pg10-14.html
4. Kessler RC, Posttraumatic stress disorder: the burden to the individual and to society. *J Clin Psychiatry*, 2000. 61 Suppl 5: 4-12; discussion 13-4.
5. Wagner AW, Wolfe J, Rotnitsky A, Proctor SP, and Erickson DJ, An investigation of the impact of posttraumatic stress disorder on physical health. *J Trauma Stress*, 2000. 13(1): 41-55.
6. Engelhard I, Van Den Hout M, Weerts J, Hox J, and Van Doornen L, A prospective study of the relation between posttraumatic stress and physcial health symptoms. *International Journal of Clinical and Health Psychology*, 2010. 9: 365-372.
7. Steenkamp MM, et al. Psychotherapy for Military-Related PTSD: A Review of Randomized Clinical Trials. *JAMA*. August 2015; 314 (5) 489-50.
8. Roth R. *Strength in Stillness: The Power of Transcendental Meditation.* New York: Simon and Schuster, 2018.
9. Rosenthal N. *Transcendence: Healing and Transformation Through Transcendental Meditation.* New York: Penguin, 2012.
10. Wallace, R.K. 1970. Physiological effects of Transcendental Meditation. *Science, 167*, 1751–1754.
11. Schneider RH, Grim CE, Rainforth MA, Kotchen TA, Nidich SI, Gaylord-King C, et al. Stress reduction in the secondary prevention of cardiovascular disease: Randomized controlled trial of Transcendental Meditation and health education in blacks. *Circulation: Cardiovascular Quality and Outcomes*, 2012;5(6):750-8.
12. Orme-Johnson DW, Moore RM. First prison study using the Transcendental Meditation program: La Tuna Federal Penitentiary. *Journal of Offender Rehabilitation*. 2003;36:89-96.
13. Orme-Johnson DW. Autonomic stability and Transcendental Meditation. *Psychosomatic Medicine*. 1973;35:341-9.
14. Geisler M. Therapeutische Wirkungen der Transcendental Meditation auf Drogenkonsumenten. *Zeitschrift fur Klinische Psychologie*. 1978;7(4):235-55.
15. Overbeck K-D. Auswirkungen der Technik der Transzendentalen Meditation (TM) auf die psychische und psychosomatische Befindlichkeit. *Psychotherapie-Psychosomatik Medizinische Psychologie*. 1982;32(6):188–92.
16. Alexander CN, Rainforth MV, Gelderloos P. Transcendental Meditation, Self-Actualization and Psychological Health: A Conceptual Overview and Statistical Meta-Analysis. *Journal of Social Behavior and Personality*. 1991;6(5):189-247.
17. MacLean CRK, Walton KG, Wenneberg SR, Levitsky DK, Mandarino JV, Waziri R, et al. Effects of the Transcendental Meditation program on adaptive mechanisms: Changes in hormone levels and responses to stress after 4 months of practice. *Psychoneuroendocrinology*. 1997;22(4):277-95.
18. Nidich S, Rainforth M, Haaga D, Hagelin J, Salerno J, Travis FT, et al. A randomized controlled trial on effects of the Transcendental Meditation program on blood pressure, psychological distress, and coping in young adults. *American Journal of Hypertension*. 2009;22:1326-31.
19. Alexander CN, Robinson P, Rainforth MV. Treating and preventing alcohol, nicotine, and drug abuse through Transcendental Meditation: a review and statistical meta-analysis. *Alcoholism Treatment Quarterly* 1994; 11(1/2):13–87
20. Candelent T, Candelent G. Teaching Transcendental Meditation in a psychiatric setting. *Hospital & Community Psychiatry* 1975; 26(3): 156–159.
21. Ljunggren G. The influence of Transcendental Meditation on neuroticism, use of drugs and insomnia. *Lakartidningen* 1977; 74(47): 4212–4214.
22. Rani NJ, Rao PVK. Effects of meditation on attention processes. *Journal of Indian Psychology*. 2000; 18: 52–60.

23. Rani NJ, Rao PVK. Meditation and attention regulation. *Journal of Indian Psychology*. 1996; 14: 26–30.
24. Hawkins M, Alexander CN, Travis FT, Camelia CR, Walton KG, Durchholz CF, Rainforth MW. Consciousness-based approach to rehabilitation of inmates in the Netherlands Antilles: psycho-social and cognitive changes. *Journal of Offender Rehabilitation* 2003; 36(1-4): 205–228.
25. Abrams AI, and Siegel LM. The Transcendental Meditation program and rehabilitation at Folsom State Prison: A cross-validation study. *Criminal Justice and Behavior* 1978; 5(1): 3–20.
26. Walton KG, Levitsky DK. Effects of the Transcendental Meditation program on neuroendocrine abnormalities associated with aggression and crime. *Journal of Offender Rehabilitation* 2003; 36: 67–87.
27. Kam-Tim S, Orme-Johnson, DW. Three randomized experiments on the holistic longitudinal effects of the Transcendental Meditation technique on cognition. *Intelligence* 2001; 29(5), 419-440.
28. A. J. Arias, Steinberg K., Banga A., al. e. "Systematic review of the efficacy of meditation techniques as treatments for medical illness." *Journal of Alternative and Complementary Medicine* 12 (2006): 817-832.
29. M. B. Ospina, Bond K., Karkhaneh M., et al. "Clinical Trials of Meditation Practices in Health Care: Characteristics and Quality." *Journal of Alternative and Complementary Medicine* 14, no. 10 (2008): 1199-1213.
30. Heffner KL, Caine ED, Crean H, et al. *Meditation for PTSD demonstration project: Final report to Mental Health Services, Department of Veteran Affairs.* Rochester, New York: Department of Psychiatry at the University of Rochester; 2014.
31. Brooks JS & Scarano T. Transcendental Meditation and the treatment of post-Vietnam adjustment. *Journal of Counseling and Development* 1985; 64: 212-215.
32. Nidich S, Mills P, Rainforth M, Heppner P, Schneider R, Rosenthal N, Salerno J, Gaylord-King C, Rutledge T. A randomised controlled trial of non-trauma focused meditation compared to exposure therapy in veterans with PTSD. *Lancet Psychiatry* (2018) Vol. 5: 12. 975-986.
33. Rees B., Travis F, Shapiro D, & Chant R. Significant Reductions in Posttraumatic Stress Symptoms in Congolese Refugees after 10 days Transcendental Meditation Practice. *Journal of Traumatic Stress* 2014*, 27*(1), 112-115.
34. Bandy C, Dillbeck M, Sezibera V, et al. Reduction of PTSD in South African University Students Using Transcendental Meditation Practice. *Psychological Reports,* On-line: February 2019.
35. Brady KT (1997). Posttraumatic stress disorder and comorbidity: recognizing the many faces of PTSD. *Journal of Clinical Psychiatry,* 58 Suppl 9:12-5.
36. Brady KT, Killeen TK, Brewerton T, Lucerini S (2000). Comorbidity of psychiatric disorders and posttraumatic stress disorder. *Journal of Clinical Psychiatry*, 61 Suppl 7:22-32.
37. 2017 Wounded Warrior Project Survey: Report of Findings. https://www.woundedwarriorproject.org/media/172072/2017-wwp-annual-warrior-survey.pdf
38. Howard JT, Sosnov JA, Janak JC, Gundlapalli AV, Pettey WB, Walker LE, Stewart IJ (2018). Associations of Initial Injury Severity and Posttraumatic Stress disorder Diagnoses with Long-Term Hypertension Risk After Combat. *Hypertension* 71:824–832.
39. Jayadevappa R., et al. Effectiveness of Transcendental Meditation on Functional Capacity and Quality of Life of African Americans with Congestive Heart Failure: A Randomized Control Study. *Ethnicity and Disease*, 2007; 17(winter): 72-77.
40. Kondwani K, et al. Left ventricular mass regression with the Transcendental Meditation technique and a health education program in hypertensive African Americans. Journal of Social Behavior and Personality 2005;17(1):181-200.
41. Chhatre S, et al. Effects of behavioral stress reduction Transcendental Meditation intervention in persons with HIV. *AIDS Care* 2013*;* 25(10), 1291-1297.
42. Nidich S, et al. Reduced trauma symptoms and perceived stress in male prison inmates through the Transcendental Meditation program: A randomized controlled trial. *The Permanente Journal* 2016*;* 20(4):16-007.
43. Barnes, V.A., Treiber, F.A., and Davis, H., Impact of Transcendental Meditation on cardiovascular function at rest and during acute stress in adolescents with high normal blood pressure. *Journal of Psychosomatic Research*, 2001; 51(4):597-605.
44. Sheppard, W. D., Staggers, F., & Johns, L. The effects of a stress management program in a high security

government agency. *Anxiety, Stress, and Coping* 1997*;* 10(4): 341-350.
45. Haratani T and Hemmi T. Effects of Transcendental Meditation on the mental health of industrial workers. *Japanese Journal of Industrial Health* 1990*;* 32: 656.
46. Wendt S, et al. Practicing Transcendental Meditation in high schools: Relationship to well-being and academic achievement among students. *Contemporary School Psychology* 2015*,* July 22.
47. Elder C, et al. Effect of Transcendental Meditation on employee stress, depression, and burnout: a randomized controlled study. *The Permanente Journal* 2014; 18:19-23.
48. Alexander, C.N., Robinson, P., and Rainforth, M., Treating alcohol, nicotine and drug abuse through Transcendental Meditation: A review and statistical meta-analysis. *Alcoholism Treatment Quarterly*, 1994; 11: 13-87.
49. Taub E, et al. Effectiveness of broad spectrum approaches to relapse in severe alcoholism: a long-term, randomized, controlled trial of Transcendental Meditation, EMG biofeedback and electronic neurotherapy. *Alcoholism Treatment Quarterly* 1994; 11(1/2):187-220.
50. Gryczynski J, Schwartz RP, Fishman M, Nordeck C, Grant J, Nidich S, Rothenberg S, O'Grady KE. Integration of Transcendental Meditation into alcohol use disorder (AUD) treatment. *Journal of Substance Abuse Treatment* April 2018; 87:23-30.
51. Eppley K, Abrams AI, and Shear J, Differential effects of relaxation techniques on trait anxiety: A meta-analysis. *Journal of Clinical Psychology*, 1989; 45(6): 957–974.
52. Orme-Johnson, D. and Walton, K., All approaches to preventing or reversing effects of stress are not the same. *American Journal of Health Promotion*, 1998; 12(5): 297-299.
53. Travis F, Shear J. Focused attention, open monitoring and automatic self-transcending: categories to organize meditations from Vedic, Buddhist and Chinese traditions. *Consciousness and Cognition* 2010 19(4):1110-1118.
54. Orme-Johnson D, Dillbeck MC. Methodological Concerns for Meta-Analyses of Meditation: Comment on Sedlmeier et al. (2012). *Psychological Bulletin* 2014; 140(2), 610–616.
55. Orme-Johnson DW, Barnes VA. Effects of the Transcendental Meditation technique on Trait Anxiety: A Meta-Analysis of Randomized Controlled Trials. *Journal of Alternative and Complementary Medicine* 2013; 20(5), 330-341.
56. Elder C, Nidich S, Moriarty F, Nidich R. Effect of Transcendental Meditation on employee stress, depression, and burnout: a randomized controlled study. *The Permanente Journal* 2014; 18:19-23.
57. Nidich S, Nidich RJ, Salerno J, Hadfield B, Elder C. Stress reduction with the Transcendental Meditation program in caregivers: A pilot study. *International Archives of Nursing and Health Care Perspectives* 2015;1(011):1-4.
58. Abrams A and Siegel L. The Transcendental Meditation program and rehabilitation at Folsom State Prison: A cross-validation study. *Criminal Justice and Behaviour* 1978*;* 5:3-20.
59. Schneider, R.H., Staggers, F., Alexander, C., Sheppard, W., Rainforth, M., Kondwani, K., Smith, S., and King, C.G., A randomized controlled trial of stress reduction for hypertension in older African Americans. *Hypertension*, 1995; 26: 820-827.
60. Alexander, C.N., Schneider, R., Staggers, F., Sheppard, W., Clayborne, M., Rainforth, M., Salerno, J., Kondwani, K., Smith, S., Walton, K., and Egan, B., A trial of stress reduction for hypertension in older African Americans (Part II): Sex and risk factor subgroup analysis. *Hypertension*, 1996; 28(1):228-237.
61. Walton, K.G., Schneider, R.H., Nidich, S.I., Salerno, J.W., Nordstrom, C.K., and Bairey-Merz, C.N., Psychosocial stress and cardiovascular disease 2: Effectiveness of the Transcendental Meditation technique in treatment and prevention. *Behavioral Medicine*, 2002; 28(3):106-123.
62. Walton, K., Schneider, R., and Nidich, S., Review of controlled research on the Transcendental Meditation Program and cardiovascular disease - Risk Factors, Morbidity and Mortality. *Cardiology in Review*, 2004; 12(5)262-266.
63. Anderson J.W., Liu C., and Kryscio R.J., Blood pressure response to transcendental meditation: A meta-analysis. *Am J Hypertens* 2008; 21:310-316.
64. Barnes, V. and Orme-Johnson, D., Clinical and Pre-Clinical Applications of the Transcendental Meditation program in the prevention and treatment of essential hypertension and cardiovascular disease in youth and adults. *Current Hypertension Reviews*, 2006; 2: 207-218.

65. Barnes, V.A., Treiber, F.A., and Davis, H., Impact of Transcendental Meditation on cardiovascular function at rest and during acute stress in adolescents with high normal blood pressure. *Journal of Psychosomatic Research*, 2001; 51(4):597-605.
66. Barnes, V.A., Treiber, F.A., and Johnson, M.H., Impact of stress reduction on ambulatory blood pressure in African American adolescents. *American Journal of Hypertension*, 2004; 17:366-369.
67. Barnes V, Monto A, Williams J, Rigg J. Impact of Transcendental Meditation on Psychotropic Medication Use Among Active Duty Military Service Members with Anxiety and PTSD. *Military Medicine* 2016; 181,1:56, 56-63.
68. Rainforth M.V., Schneider R.H., Nidich S.I., Gaylord-King, C., Salerno J.W., and Anderson J.W., Stress Reduction Programs in Patients with Elevated Blood Pressure: A Systematic Review and Meta-analysis. *Current Hypertension Reports* 2007; 9:520–528.
69. Anderson Anderson JW, et al. Blood pressure response to Transcendental Meditation: a meta-analysis. *American Journal of Hypertension* 2008; 21:310-316.
70. Bai Z, et al. Investigating the effect of transcendental meditation on blood pressure: a systematic review and meta-analysis. *Journal of Human Hypertension* 2015; 29:653-662.
71. Brook RD, et al. Beyond medications and diet: alternative approaches to lowering blood pressure. A scientific statement from the American Heart Association. *Hypertension* 2013; 61:1360-1383.
72. Sedlmeier P, et al. The psychological effects of meditation: A meta-analysis. *Psychological Bulletin* 2012; 138*,* 1139–1171.
73. Herron RE, Rees B. The Transcendental Meditation Program's Impact on the symptoms of Post-traumatic Stress Disorder of Veterans: An Uncontrolled Pilot Study. *Military Medicine* 2017, 183, pp. 144-150.
74. Kang SS, Erbes CR, Lamberty GJ, et al. Transcendental meditation for veterans with post-traumatic stress disorder. *Psychological Trauma* 2018; 10(6):675-680.
75. Rosenthal JZ, Grosswald S, Ross R, Rosenthal, N. Effects of Transcendental Meditation in veterans of Operation Enduring Freedom and Operation Iraqi Freedom with posttraumatic stress disorder: a pilot study. *Military Medicine* 2011, 176, 626-630.
76. Bremner JD, Mishra S, Campanella C, Shah M, Kasher N, Evans S., et al. A Pilot Study of the Effects of Mindfulness-Based Stress Reduction on Post-traumatic Stress Disorder Symptoms and Brain Response to Traumatic Reminders of Combat in Operation Enduring Freedom/Operation Iraqi Freedom Combat Veterans with Post-traumatic Stress Disorder. *Frontiers in Psychiatry 2017, August. 25*. doi:org/10.3389/fpsyt.2017.00157
77. Possemato K, Bergen-Cico D, Treatman S, Allen C, Wade M, Pigeon W. A randomized clinical trial of primary care brief mindfulness training for veterans with PTSD. *Journal of Clinical Psychology,* 2016, *72*, 179–193.
78. Kearney DJ, McDermott K, Malte C, Martinez M, Simpson TL. Association of participation in a mindfulness program with measures of PTSD, depression and quality of life in a veteran sample. *Journal of Clinical Psychology*. 2012;68(1):1-16.
79. Kearney DJ, McDermott K, Malte C, Martinez M, Simpson TL. Effects of participation in a mindfulness program for veterans with posttraumatic stress disorder: A randomized controlled pilot study. *Journal of Clinical Psychology*. 2013;69(1):14-27.
80. Niles, BL., Klunk-Gillis J, Ryngala D, Silberbogen A, Paysnick A, Wolf E. Comparing mindfulness and psychoeducation treatments for combat-related PTSD using a telehealth approach. *Psychological Trauma: Theory, Research, Practice, and Policy, 2012, 4*(5), 538-547.
81. Polusny MA, Erbes C, Thuras P, Moran A, Lamberty G, Collins R, Rodman J, Lim K. Mindfulness-Based Stress Reduction for Posttraumatic Stress Disorder among veterans: A randomized clinical trial. *JAMA, 2015, 314*, 456–465. doi:10.1002/jclp.22241
82. Davis L, Whetsell C, Hamner M, Carmody J, Rothbaum B, Allen, R, Bremner, Douglas. A Multisite Randomized Controlled Trial of Mindfulness-Based Stress Reduction in the Treatment of Posttraumatic Stress Disorder. *Psychiatric Research and Clinical Practice in Advance, 2018*, 1-10. doi:0.1176/appi.prcp.20180002)
83. Congressional Budget Office. The Veterans Health Administration's Treatment of PTSD and Traumatic Brain Injury Among Recent Combat Veterans. February 2012.
84. Orme-Johnson DW. Medical care utilization and the Transcendental Meditation program. *Psychosomatic*

*Medicine*1987; 49:493–507.
85. Herron RE. Changes in physician costs among high-cost Transcendental Meditation practitioners compared with high cost non-practitioners over 5 years. *American Journal of Health Promotion* 2011; 26(1): 56–60.
86. Herron RE, Cavanaugh K. Can the Transcendental Meditation program reduce medical expenditures of older people? A longitudinal medical cost minimization study in Canada. *Journal of Social Behavior and Personality* 2005; 17: 415–442.
87. Herron RE, Hillis SL. The impact of the Transcendental Meditation program on government payments to physicians in Quebec: An update. *American Journal of Health Promotion* 2000; 14:284–291.
88. Bellehsen M, Stoycheva V, Cohen B, Nidich S. Submitted. Transcendental Meditation as an Adjunctive Treatment for PTSD in Veterans. The Unified Behavioral Health Center for Military Veterans and their Families: Northwell Health. Available on request.
89. Tedeschi R, Moore B. Warrior PATHH 18-Month Report (January 2019) https://static1.squarespace.com/static/54b6abd6e4b07b4a7d04efb5/t/5c572bccec212d2d5aa40c4d/1549216718611/Small_Digital_Vol+4_18+Month+Study+Interim+Report.pdf
90. Chapin M. Program Evaluation Report: Implementing Transcendental Meditation Training as a Tool for PTSD Recovery. Annapolis Vet Center. May 17, 2016.
91. Rees B., Travis F, Shapiro D, & Chant R. Reduction in post traumatic stress symptoms in Congolese refugees practicing Transcendental Meditation. *Journal of Traumatic Stress* 2013*, 26*, 295-298.
92. Nidich S, Seng A, Compton B, et al. "Transcendental Meditation and Reduced Trauma Symptoms in Female Inmates: A Randomized Controlled Study." *Permanente Journal* 2017, 21.