

The Transcendental Meditation Program's Impact on the Symptoms of Post-traumatic Stress Disorder of Veterans: An Uncontrolled Pilot Study

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ABSTRACT Background: Current treatments for post-traumatic stress disorder (PTSD) are only partially effective. This study evaluated whether an extensively researched stress reduction method, the Transcendental Meditation (TM) technique, can reduce the PTSD symptoms of veterans. Previous research suggested that TM practice can decrease veterans' PTSD symptoms. Methods: A one-group pretest–posttest design was used to evaluate the impact of TM practice on reducing PTSD symptoms. A convenience sample of 89 veterans completed PTSD Checklist-Civilian (PCL-5) questionnaires. Among those, 46 scored above 33, the threshold for provisional diagnosis of PTSD, and were included in this evaluation. The PCL-5 measured PTSD symptoms at baseline and 30 and 90 d after intervention. Regularity of TM practice was recorded. Paired sample *t*-tests were used to assess within-group changes from baseline to post-intervention periods. Analysis of variance was used to compare full-dose (two 20-min TM sessions per day) and half-dose (one 20-min TM session per day) groups. Findings: After 1 mo of TM practice, all 46 veterans responded; their PCL-5 average decreased from 51.52 in the pre-intervention period to a post-intervention mean of 23.43, a decline of 28.09 points (–54.5%); standard deviation: 14.57; confidence interval: 23.76–32.41; and effect size: –1.93; $p < 0.0001$. The median PTSD scores declined from 52.5 to 22.5, a decrease of 30 points (–57%), while 40 veterans (87%) had clinically significant declines (>10 points) in PTSD symptoms, and 37 (80%) dropped below the clinical level (<33). At the 90 d posttest, 31 of the 46 responded and three more dropped below the 33 threshold. Intent-to-treat analyses revealed clinically and statistically significant effects. A dose–response effect suggested a causal relationship. The full-dose group exhibited larger mean declines in PTSD symptoms than the half-dose group. Averages of the 46 veterans' responses to 20 PCL-5 questions exhibited significant ($p < 0.0001$) declines from the pre-intervention period to the 30-d post-intervention assessment. Discussion: Results indicated that TM practice reduced PTSD symptoms without re-experiencing trauma. Because of the magnitude of these results and dose–response effect, regression to the mean, spontaneous remission of symptoms, and placebo effects are unlikely explanations for the results. Major limitations were absence of random assignment and lack of a control group. Participants chose to start and continue TM practice and to complete PCL-5 questionnaires. Those who self-selected to enter this study may not be representative of all veterans who have PTSD. Those who did not complete follow-up questionnaires at 90 d may or may not have had the same results as those who responded. The design and sampling method affect the generalizability of the results to wider populations. When taking into account these results and all previous research on the TM technique in reducing psychological and physiological stress, the convergence of evidence suggests that TM practice may offer a promising adjunct or alternative method for treating PTSD. Because of the widely recognized need to identify effective new approaches for treating PTSD, randomized research with control groups is warranted to further investigate the effectiveness of TM practice as a treatment for PTSD.

INTRODUCTION

The purpose of this study is to determine whether the practice of the Transcendental Meditation (TM) technique can reduce the post-traumatic stress disorder (PTSD) symptoms of veterans. PTSD can afflict persons who experience a traumatic event. Too often, military personnel in combat get PTSD. The Institute of Medicine reported that “In 2012, 13.5% of soldiers had a diagnosis of PTSD, as did 10% of Marines, 4.5% of Navy personnel, and 4% of Air Force personnel.”¹ Symptoms can include repeated disturbing memories, depression, anxiety, negative emotions, hypervigilance, reminder avoidance,

inability to concentrate, and persistent flashbacks and nightmares of traumatic events. PTSD is psychologically debilitating and can adversely impact all areas of veterans' lives, including their physical health and families.¹ PTSD is also a risk factor for suicide.^{2,3} High suicide rates are a major concern for both active duty personnel and veterans. Effective treatment for PTSD might help reduce suicide rates.

The U.S. government has tried to help veterans with PTSD. Yet, cures are elusive. One of the gold standard treatments, prolonged exposure therapy, requires the victims to re-experience their trauma, which many veterans are unwilling to undertake. The standard treatments for PTSD, such as prolonged exposure therapy, cognitive processing therapy, and medication, are only partially successful.^{1,4} A review of randomized clinical trials by Steenkamp et al found “approximately two-thirds of patients receiving cognitive processing therapy or prolonged exposure retained their PTSD diagnosis after treatment (range 60%–72%).”⁵

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In addition to the psychological and health impacts of PTSD, this disorder also causes high financial costs. The Congressional Budget Office reported that \$20,200 is the average Department of Veterans Affairs' expense for treating a veteran for 4 yr who has PTSD without co-morbidities. As veterans with PTSD often have co-morbidities, the total costs of their treatment tends to be even higher.⁴ For all these reasons, recent reports on PTSD have suggested that additional research is needed to identify more effective methods for treating this disorder.^{1,4}

The TM technique was chosen for evaluation because previous research suggested that this procedure can decrease PTSD symptoms. A 3-mo randomized trial compared TM ($n = 9$) and psychotherapy ($n = 9$) in reducing the symptoms of post-Vietnam adjustment. The psychotherapy group experienced no improvement, whereas the TM group improved significantly on eight variables, including a 40% decline in PTSD symptoms.⁶ A randomized, matched-control study evaluated the effects of TM practice on the post-traumatic stress symptoms of civilian refugees from the Second Congo War. All participants ($n = 42$) had high PTSD Checklist-Civilian (PCL-C) scores at baseline. Of the TM group, 90% reached the "non-symptomatic" level after 30 d of TM practice, while none of the wait list controls had a significant change in their scores.⁷ PCL score reductions were sustained over the 135-d duration of the study. A follow-up study that included non-matched controls replicated the 30-d findings and found that 2/3 of the decline in PTSD symptoms occurred within the first 10 d for the TM participants.^{7,8} An uncontrolled pilot study published in *Military Medicine* assessing five veterans with recent combat-related PTSD found that after 12 wk of TM practice, all subjects improved on the Clinician Administered PTSD Scale (mean change score, 31.4; $p = 0.02$; $df = 4$).⁹ A case study evaluation of three active duty soldiers with severe PTSD at Fort Gordon, GA, found that TM practice had a beneficial impact in reducing PTSD symptoms.¹⁰ Barnes et al found a reduction in psychotropic medication use among active duty military soldiers with anxiety disorder and PTSD, which suggests their PTSD symptoms had decreased.¹¹ The previously published research on the direct impact of TM practice on veterans' PTSD symptoms consists of pilot studies. This study seeks to expand this area of research by evaluating a larger sample of veterans than earlier studies. The hypothesis is that TM practice will decrease the post-traumatic stress symptoms of veterans. The null hypothesis is that there will be no significant difference between the pre- and post-intervention post-traumatic stress symptoms.

METHODS

This study used a one-group pretest-posttest design. Participants served as their own controls. A convenience sample of 89 veterans was initially evaluated for possible inclusion in this study. A donation from Christopher H. Wege and the non-profit Wege Foundation enabled these

veterans to take the TM course and lifetime follow-up at a reduced instructional fee. Centers across the United States that teach TM were informed of the availability of grant funds and encouraged to invite veterans, ideally those with PTSD, to learn TM. Local TM teachers approached various Veterans Service Organizations and VA clinics in order to recruit subjects. Participants were recruited at introductory TM lectures to various veterans' organizations throughout the United States. They volunteered to learn the TM technique and participate in the study. These volunteers had to fulfill three criteria for participating: (1) be a veteran or on active duty in the U.S. Armed Forces with mental health challenges, (2) agree to take each step of the TM instruction and follow-up program, and (3) agree to complete research questionnaires three times. Each veteran consented to these requirements and freely chose to participate in this project. No one was rejected due to race, ethnicity, gender, sexual orientation, or any other factor. This study was approved by the Institutional Review Board at Maharishi University of Management in Fairfield, Iowa.

The inclusion criterion for this evaluation was a PCL-5 score over 33, the threshold for provisional PTSD diagnosis. Of the 89 veterans who were initially assessed for possible inclusion in this study, 46 tested above the 33 threshold. The others who had PCL-5 scores below 33 were excluded because the purpose of this study is to assess the impact of the intervention only on those with a provisional diagnosis of PTSD. Among the 46 participants with PCL-5 scores over 33, there were seven females and 39 males. Their average age was 51 yr, with an age range from 28 to 77 yr. Five participants (two females and three males) were still on active duty and 41 were veterans. Six of the participants with PCL-5 scores greater than 33 served in Vietnam, two served in the Gulf War, one in Somalia, and the remaining 37 served in post-Sept 11, 2001 combat in Iraq and Afghanistan.

Efficacy Assessment

The efficacy of the treatment was measured by the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (PCL-5). The PCL-5 is a standard self-report measure of PTSD symptoms that includes the latest changes in Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5) criteria. Several studies have documented the reliability of the PCL-5.¹² In assessing the psychometric properties of the PCL-5, Blevins et al found "Overall results indicate that the PCL-5 is a psychometrically sound measure of PTSD symptoms."¹³ In a more recent evaluation, Wortmann et al found:

The results indicate that the PCL-5 is a psychometrically sound measure of DSM-5 PTSD symptoms that is useful for identifying provisional PTSD diagnostic status, quantifying PTSD symptom severity, and detecting clinical change over time in PTSD symptoms among service members seeking treatment.¹⁴

The PCL-5 questionnaire contains a numerical scale (Likert: 0–4) for each of its 20 questions, which enabled a quantitative description and statistical analysis of the TM participants' PTSD symptoms.¹⁵ The PCL-5 scores can range from 0 to 80. A decrease in PTSD scores of 10 or more points is considered clinically significant. A PCL-5 score over 33 is consistent with a provisional diagnosis of PTSD.¹² This instrument assessed self-reported PTSD symptoms at baseline before starting TM instruction and at approximately 30 and 90 d after intervention. The subjects were evaluated after 30 d of TM practice because previous research suggests that most of the reduction in PTSD symptoms occurs in 30 d or less.^{7–9} The veterans were assessed again at 90 d to determine whether the initial declines were sustained. Post-intervention questionnaires also asked the participants to report their regularity of TM practice, which showed compliance with the intervention. To protect their privacy, an administrator assigned numbers to each participant to use on their PCL-5 questionnaires instead of names. All collected questionnaires were anonymous. All of the de-identified responses contained in these questionnaires were entered into a database.

Description of the TM Technique

Participants received the standard TM course and follow-up. The outline of this course is available at www.tm.org/learn-tm. No manual was utilized as the TM technique is always taught in a standardized manner. The TM technique is taught by highly trained certified instructors in the same systematic way worldwide as formulated by the late Maharishi Mahesh Yogi, the founder of the TM program. The TM technique is an extensively researched meditation that has been found to promote a wide range of mental and physical benefits, including large reductions in anxiety¹⁶ and significant improvements in heart health.^{17,18} TM practice is safe¹⁹ and does not require participants' to re-experience traumatic events or take drugs to reduce stress. By paraphrasing the tm.org website, the TM technique can be described as in the following paragraph.

The TM technique is a simple, natural, effortless, standardized procedure practiced for 20 min twice daily while sitting comfortably with eyes closed. TM practice enables the mind to settle down effortlessly and spontaneously to experience more refined, quiet states of the thinking process until one transcends thinking to experience the source of thought. As the mind settles down to quieter, more peaceful levels, the brain begins to function in a more relaxed, orderly, and coherent way. At the same time, the body gains a deep level of rest, allowing it to release accumulated stress, strain, and fatigue. TM practice involves no concentration, no focusing of the mind, and no "mindful" monitoring of thoughts. The TM program requires no belief or lifestyle change and can be easily learned and practiced by people of any age, level of education, race, occupation, religion, or ethnicity. The TM technique is unique in that its principles, practice, and impact on brain functioning are fundamentally different from those of other meditation and relaxation procedures.

TM instruction was provided by *TM for Veterans*, a branch of the Maharishi Foundation USA[®] which is a 501(c) 3 non-profit educational organization.

Analysis

Paired sample *t*-tests were used to assess within-group changes in outcome measures from baseline to post-intervention. Analysis of variance was used to compare the full-dose group and the half-dose group at 30 d and 90 d after the intervention. These tests were performed with the Systat 12 and 13 statistical software. Systat is a comprehensive statistical analysis software that is used in many medical and scientific disciplines (see www.systat.com). The paired sample *t*-tests and analysis of variance were calculated at the 95% confidence level. The *p*-values for the paired *t*-tests included the Bonferroni adjustment for multiple tests of statistical significance. Means, medians, standard deviations (SD), confidence intervals (C.I.), effect sizes, and percentage changes were calculated. The data were normally distributed and not afflicted with undue skewness or kurtosis.

Two intent-to-treat (ITT) analyses were calculated for the entire group of participants ($n = 46$) to account for the missing data of the 15 participants who did not respond at 90 d. The most commonly used method, the Last Observation Carried Forward, was performed. A second more conservative Initial Observation Carried Forward analysis was performed which assumed that the PCL-5 scores at baseline and at the 90 d posttest were identical for the 15 participants with missing data. These two analyses provided an estimated range of what the mean results might have been for the 46 participants at the 90 d posttest. An additional ITT analysis using the Last Observation Carried Forward method compared the full-dose and half-dose groups at the 90 d posttest. This last ITT analysis assumed that the 15 missing cases at the 90 d posttest had the same regularity of TM practice they reported at the 30 d posttest.

RESULTS

Of the 46 veterans with pre-intervention PTSD scores >33 , 80% (37) dropped below the clinical level (≤ 33) after 1 mo of TM practice. At the 30 d posttest, 87% (40) had a clinically significant drop in PTSD symptoms of 10 or more points. After 1 mo of TM practice, all 46 veterans responded; their PCL-5 average decreased from 51.52 in the pre-intervention period to a post-intervention mean of 23.43, a decline of 28.09 points (-54.5%); SD: 14.57; C.I. 23.76–32.41; effect size: -1.93 ; $p < 0.0001$ (Fig. 1). The median decline on their PTSD scores was from 52.5 to 22.5, a decrease of 30 points (-57%).

The results from 30 d of TM practice may have been sustained. The PTSD scores continued to decline for the 31 participants from whom we have received responses after approximately 90 d of TM practice. At the 90 d posttest, the 31 veterans' PCL-5 mean decreased from 49.45 (SD: 11.69) in the pre-intervention period to a post-intervention mean of 20.84. The difference between the pretest and posttest averages

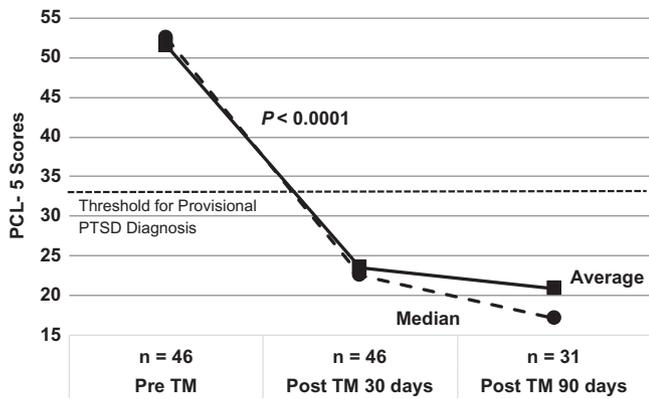


FIGURE 1. Average and Median PCL-5 Scores Before and After Starting the TM Program.

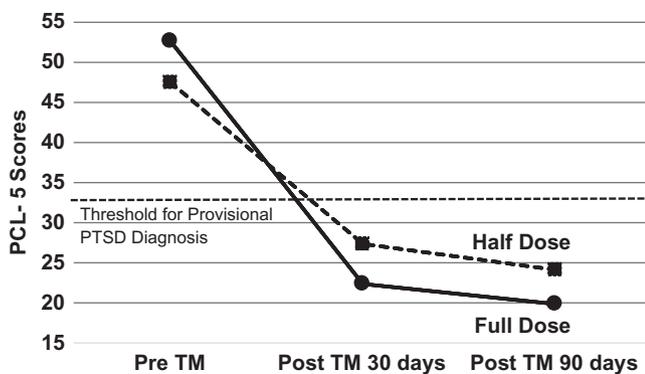


FIGURE 2. Dose-Response Effect: PCL-5 Averages of Full-Dose and Half-Dose Groups.

was 28.61 points (SD: 15.79; C.I. 22.82–34.40; effect size: -1.82 ; $p < 0.0001$). The median decline on their PCL-5 scores was from 48 to 17, a decrease of 31 points (-64.58%).

Fifteen of the 46 participants were lost to follow-up at 90 d. The incomplete 90-d data suggests continued decline as shown in Figures 1 and 2 and Table I. In addition to the 37 veterans who dropped below the clinical level of 33 after 1 mo of TM practice, three more dropped below that threshold at the 90-d evaluation. Although most of the observed reductions occurred in the first 30 d of TM practice, these decreases at 90 d suggest the possibility of an ongoing improvement in PTSD symptoms.

Although we do not know why 15 of the 46 participants were lost to follow-up at 90 d, a separate analysis of these 15 veterans at the 30 d posttest showed encouraging results. Their PCL-5 average decreased from 55.8 in the pre-intervention period to a 30-d mean of 22.4, a decline of 33.4 points (-59.86%); SD: 15.01; C.I. 25.09–41.7; effect size: -2.22 ; $p < 0.0001$. Furthermore, in the 30 d posttest, 13 of these 15 had clinically significant declines (>10) in their PCL-5 scores, and 13 dropped below the clinical level (≤ 33) after 1 mo of TM practice.

Two ITT analyses were done to account for the missing data of the 15 participants who did not respond at 90 d. The

TABLE I. Dose-Response Effect: Comparison of Full-Dose and Half-Dose PCL-5 Scores

Groups	Pre-TM	Post TM 30 d	Post TM 90 d	Post TM 90 d ITT
Full dose				
Means	52.64	22.36	19.87	19.92
Variances	144.35	149.44	173.5	141.28
<i>n</i>	36	36	24	36
Half dose				
Means	47.50	27.3	24.14	26.5
Variances	100.5	364.01	540.47	424.28
<i>n</i>	10	10	7	10
C.I.	0.278–2.457	0.973–8.6	1.03–15.97	1.2–10.6
<i>F</i> -ratios	0.696	2.436	3.115	3.0
df	9, 35	9, 35	6, 23	9, 35
<i>p</i> -Values	0.5847	0.057	0.044	0.02

In these analyses of variance, the last column is an ITT analysis using the Last Observation Carried Forward method. This ITT analysis assumed the 15 missing cases at the 90 d posttest had the same regularity of TM practice they reported at the 30 d posttest.

Last Observation Carried Forward method showed that for the sample of 46 participants, the pretest mean PCL-5 score was 51.52, and at the 90 d posttest, the mean was 21.35, a decline of 30.17 points (SD: 15.54; C.I. 25.56–34.79; effect size: -1.94 ; $p < 0.0001$). The second more conservative Initial Observation Carried Forward analysis assumed that the 15 subjects lost to follow-up had discontinued TM and/or had lost whatever benefit they had gained. Thus, the baseline pre-TM PCL-5 scores of those 15 subjects were used as their 90-d results. In this second analysis, for the entire sample of 46 veterans, the pretest mean PCL-5 score was 51.52, and at the 90 d posttest, the mean was 32.24, a decline of 19.28 points (SD: 18.71; C.I. 13.73–24.84; effect size: -1.03 ; $p < 0.0001$). Thus, the estimated range of mean decline from baseline to the 90 d posttest for the 46 subjects is 30–19 points.

A dose-response effect suggested a causal relationship. Despite instructions to practice TM twice per day, some veterans were irregular in practice and on average meditated only once per day. We labeled these the “half-dose” group. Although the full-dose and the half-dose groups both showed clinically and statistically significant declines in average PTSD symptoms, the full-dose group exhibited larger mean declines in PTSD symptoms than the half-dose group (Fig. 2 and Table I). After 1 mo of TM practice, mean full-dose PTSD scores declined 30 points, whereas half-dose scores declined 20 points. As we see in Table I, there was no statistically significant difference between the two groups in the Pre-TM period. After 30 d of TM practice, the difference between the full-dose and half-dose groups’ PTSD scores trended toward significance. After 90 d of TM practice, among the responders, there was a statistically significant difference between the full-dose and half-dose groups ($p = 0.044$). The ITT analysis that accounted for the 15 missing responses in the 90 d posttest showed a larger statistically significant difference between the full-dose and half-dose groups ($p = 0.02$).

Before and after intervention comparisons were made for the means of each of the 20 subscales in the PCL-5 questionnaire (see Table II). All of the averages in the 20 subscales in Table II exhibited significant declines ($p < 0.0001$) from the pre-intervention period to the 30-d post-intervention period. The TM technique appears to have had a uniform impact across all dimensions of PTSD as measured by the PCL-5 questionnaire, which suggests that a holistic psychological and physiological transformation may have been occurring in these participants.

DISCUSSION

The results indicated that TM practice reduced PTSD symptoms and supported the hypothesis; the null hypothesis was rejected. These results suggest that TM practice can reduce PTSD symptoms without re-experiencing trauma. Of veterans with pre-intervention scores >33 (the threshold for provisional PTSD diagnosis), 80% dropped below the clinical level (≤ 33) after 1 mo of TM practice, and improvement persisted at 90 d. At the 90 d posttest, three more veterans' PCL-5 scores dropped below the 33 threshold. Most of the symptoms decreased within 30 d of starting TM practice, but there are no data to suggest that those benefits would persist if the TM practice was discontinued. The possibilities of ongoing improvements in PTSD symptoms, of additional psychological¹⁶ and physiological health benefits,^{17,18,20} and of the cultivation of resilience to handle future traumatic events²¹ support the recommendation to continue regular TM practice indefinitely.

Furthermore, the results suggest a dose–response effect. The full-dose group exhibited larger mean declines in PTSD symptoms than the half-dose group. Although a definitive verification of a causal relationship requires several randomized clinical trials, the discovery of a dose–response effect in this study strengthens the importance of the findings. A dose–response effect is one of the well-accepted and classic criteria for establishing a causal relationship between two variables.^{22–24} This dose–response finding supports a recommendation for clinicians to encourage their PTSD patients to practice the TM technique regularly twice a day for 20 min to achieve the maximum benefits in the shortest time.

Regarding alternative explanations for the results, regression to the mean could have been a confounder. However, regression to the mean or simultaneous spontaneous remission of symptoms seem to be unlikely explanations for the results in this study as the measurements were taken over a relatively short time frame, 30 d and 90 d after intervention. PTSD tends to be an intractable disorder with both psychological and neurological components that usually resist rapid improvement. Many veterans who fought in the Korean War and the war in Vietnam still suffer from PTSD symptoms even though decades have elapsed since their combat-related traumas were incurred. PTSD is so resistant to improvement that even the majority of veterans who have received the “gold standard” treatments for this disorder have retained

TABLE II. Mean PCL-5 Scores (0–4) Before and After 1 mo of TM Practice

PCL-5 Questions	Before Means	After Means	Mean Changes
1. Repeated, disturbing, and unwanted memories of the stressful experience?	2.67	1.41	–1.26
2. Repeated, disturbing dreams of the stressful experience?	2.39	1.00	–1.39
3. Suddenly feeling or acting as if the stressful experience was actually happening again (as if you were actually back there reliving it)?	2.19	0.93	–1.26
4. Feeling very upset when something reminded you of the stressful experience?	2.72	1.30	–1.42
5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, and sweating)?	2.65	1.11	–1.54
6. Avoiding memories, thoughts, or feelings related to the stressful experience?	2.63	1.30	–1.33
7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?	2.70	1.48	–1.22
8. Trouble remembering important parts of the stressful experience?	2.11	1.04	–1.07
9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?	2.63	1.06	–1.57
10. Blaming yourself or someone else for the stressful experience or what happened after it?	2.57	0.95	–1.62
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?	2.91	1.22	–1.69
12. Loss of interest in activities that you used to enjoy?	2.61	1.15	–1.46
13. Feeling distant or cut off from other people?	2.83	1.28	–1.55
14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?	2.54	1.02	–1.52
15. Irritable behavior, angry outbursts, or acting aggressively?	2.61	1.00	–1.61
16. Taking too many risks or doing things that could cause you harm?	1.93	0.56	–1.37
17. Being “superalert” or watchful or on guard?	2.54	1.50	–1.04
18. Feeling jumpy or easily startled?	2.43	1.24	–1.19
19. Having difficulty concentrating?	3.02	1.45	–1.57
20. Trouble falling or staying asleep?	2.83	1.39	–1.44

their PTSD diagnosis.⁵ Thus, over the comparatively short measurement period of this study, regression to the mean or spontaneous remission of symptoms seems to be unlikely explanations for the results.

As no study is perfect, 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.²⁵ The results of this study are similar to those of earlier studies that have evaluated the effects of the TM program on PTSD.^{6–11} In addition, more than 350 scientific studies published in over 160 peer-reviewed scientific journals have documented the benefits of TM practice for mind, body, and behavior.²⁰ When considering all of the research on the impact of the TM technique in reducing psychological and physiological stress, the convergence of evidence suggests that TM practice may offer a promising adjunct or alternative method for treating PTSD that may be more acceptable to many of those with PTSD than current approaches.

Study Limitations

This study's limitations affect the interpretation of results. The three major limitations were the absence of random assignment, the lack of a control group, and lack of blind data collection. Participants chose to start and continue TM practice and to complete PCL-5 questionnaires. Those who selected themselves to enter this study may not be representative of all veterans who have PTSD. Those who did not complete follow-up questionnaires may or may not have had the same results as those who complied. Other possible confounders, such as suggestion, expectation, and attention have generally had little or no impact on PTSD symptoms. Numerous randomized clinical trials that compared PTSD treatments with placebos found that placebos (i.e., inert substances and suggestion, expectation, and attention) have had almost no clinically or statistically significant effect on post-traumatic stress symptoms.^{26–29} Anecdotal experience of one of the authors suggests that, on the whole, the population of combat veterans with a diagnosis of PTSD is not particularly motivated to report outcomes to make researchers and clinicians happy. Also, subjects' scores were submitted in written form and were anonymous aside from an identifying code number known only to a remote author who never met the subjects. However, as this study was funded by a foundation sympathetic to TM, and both authors are affiliated to some degree with TM-related organizations, the possibility of implicit bias subtly influencing results is a consideration. The absence of an active control or other comparator leaves unknown the possible magnitude of nonspecific effects of treatment in this study.

The design and sampling method of the study affect the generalizability of the results to wider populations. Recent reports on PTSD have suggested that additional research is needed to identify more effective methods for treating this disorder.^{1,4,30} When considering that 60–72% of patients retain their PTSD diagnosis after the standard treatments for this disorder,⁵ randomized research with control groups seems warranted to replicate and further elucidate the findings of this study.

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REFERENCES

1. Institute of Medicine: Treatment for Posttraumatic Stress Disorder in Military and Veteran Populations: Final Assessment. Washington, DC, Institute of Medicine, 2014.
2. Pompili M, Sher L, Serafini G, et al: Posttraumatic stress disorder and suicide risk among veterans: a literature review. *J Nerv Ment Dis* 2013; 201(9): 802–12.
3. Pukay-Martin ND, Pontoski KE, Maxwell MA, et al: The influence of depressive symptoms on suicidal ideation among U.S. Vietnam-era and Afghanistan-era veterans with posttraumatic stress disorder. *J Trauma Stress* 2012; 25(5): 578–82.
4. Congressional Budget Office: The Veterans Health Administration's Treatment of PTSD and Traumatic Brain Injury among Recent Combat Veterans. Washington, DC, Congressional Budget Office, 2012. Available at: https://www.cbo.gov/sites/default/files/112th-congress-2011-2012/reports/02-09-PTSD_0.pdf. Accessed: July 14, 2014.
5. Steenkamp MM, Litz BT, Hoge CW, Marmar CR: Psychotherapy for military-related PTSD: a review of randomized clinical trials. *JAMA* 2015; 314(5): 489–500.
6. Brooks JS, Scarano T: Transcendental meditation in the treatment of post-Vietnam adjustment. *J Couns Dev* 1985; 64: 212–5.
7. Rees B, Travis F, Shapiro D, Chant R: Reduction in posttraumatic stress symptoms in Congolese refugees practicing Transcendental Meditation. *J Trauma Stress* 2013; 26(2): 295–8.
8. Rees B, Travis F, Shapiro D, Chant R: Significant reductions in post-traumatic stress symptoms in Congolese refugees within 10 days of Transcendental Meditation practice. *J Trauma Stress* 2014; 27(1): 112–5.
9. Rosenthal JZ, Grosswald SJ, 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. *Mil Med* 2011; 176(6): 626–30.
10. Barnes VA, Rigg JL, Williams JJ: Clinical case series: treatment of PTSD with Transcendental Meditation in active duty military personnel. *Mil Med* 2013; 178(7): e836–840.
11. 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. *Mil Med* 2016; 181: 56–63.
12. Bovin MJ, Marx BP, Weathers FW, et al: Psychometric properties of the PTSD checklist for Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (PCL-5) in veterans. *Psychol Assess* 2016; 28(11): 1379–1391; <http://dx.doi.org/10.1037/pas0000254>; accessed Jan. 15, 2017.

13. Blevins CA, Weathers FW, Davis MT, et al: The posttraumatic stress disorder checklist for DSM-5 (PCL-5): development and initial psychometric evaluation. *J Trauma Stress* 2015; 28(6): 489–98.
14. Wortmann JH, Jordan AH, Weathers FW, et al: Psychometric analysis of the PTSD checklist-5 (PCL-5) among treatment-seeking military service members. *Psychol Assess* 2016DOI:10.1037/pas0000260; accessed Sept. 25, 2016.
15. American Psychiatric Association: Diagnostic and statistical manual of mental disorders. In: DSM-5, 5th Edition, Washington, DC, American Psychiatric Publishing, 2013.
16. Orme-Johnson DW, Barnes VA: Effects of the Transcendental Meditation technique on trait anxiety: a meta-analysis of randomized controlled trials. *J Altern Complement Med* 2013; 19: 1–12.
17. Schneider RH, Alexander CN, Staggars F, et al: Long-term effects of stress reduction on mortality in persons > or =55 years of age with systematic hypertension. *Am J Cardiol* 2005; 95(9): 1060–4.
18. Schneider RH, Grim CE, Rainforth MV, et al: Stress reduction in the secondary prevention of cardiovascular disease: randomized controlled trial of Transcendental Meditation and health education in blacks. *Circ Cardiovasc Qual Outcomes* 2012; 5(6): 750–8.
19. Orme-Johnson DW, Herron RE: An innovative approach to reducing medical care utilization and costs. *Am J Manag Care* 1997; 3(1): 135–44.
20. Dillbeck MC (Editor) Scientific Research on Maharishi's Transcendental Meditation and TM-Sidhi Program: Collected Papers, Vols. 1–7. Vlodrop, the Netherlands, Maharishi Vedic University Press, 1977–2013.
21. Rees B: Overview of outcome data of potential meditation training for soldier resilience. *Mil Med* 2011; 176: 1232–42.
22. Doll R: Sir Austin Bradford Hill and the progress of medical science. *BMJ* 1991; 305: 1521–6.
23. Hill AB: The environment and disease: association or causation? *J R Soc Med* 1965; 58: 295–300.
24. Susser M: Judgement and causal inference: criteria in epidemiologic studies. *Am J Epidemiol* 1977; 105: 1–15.
25. Carey TA, Stiles WB: Some problems with randomized clinical trials and some viable alternatives. *Clin Psychol Psychother* 2016; 23: 87–95.
26. Raskind MA, Peskind ER, Kanter ED, et al: Reduction of nightmares and other PTSD symptoms in combat veterans by prazosin: a placebo-controlled trial. *Am J Psychiatry* 2003; 160: 371–3.
27. Hertzberg MA, Feldman ME, Beckham JC, et al: Lack of efficacy for fluoxetine in PTSD: a placebo controlled trial in combat veterans. *Ann Clin Psychiatry* 2000; 12(2): 101–5.
28. Schneier FR, Campeas R, Carcamo J, et al: Combined mirtazapine and SSRI treatment of PTSD: a placebo controlled trial. *Depress Anxiety* 2015; 32(8): 570–9.
29. Germain A, Richardson R, Moul DE, et al: Placebo-controlled comparison of prazosin and cognitive-behavioral treatments for sleep disturbances in U.S. military veterans. *J Psychosom Res* 2012; 72(2): 89–96.
30. Hepner KA, Sloss EM, Roth CP, et al. Quality of Care for PTSD and Depression in the Military Health System: Phase I Report. 2016:1–221. RAND Corporation, Santa Monica, CA. Available at: http://www.rand.org/pubs/research_reports/RR978.html; accessed Oct. 19, 2016.